POLISH ARMOR OF THE BLITZKRIEG

JAMIE PRENATT

ILLUSTRATED BY HENRY MORSHEAD

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NEW VANGUARD 224

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POLISH ARMOR OF THE BLITZKRIEG

INTRODUCTION

The genesis of Poland's armored forces was the formation of the 1st Polish Tank Regiment on March 15, 1919 in France. Created from a French tank regiment manned partly by ethnic Poles that had fought in World War I, the 1st Tank Regiment was equipped with 120 FT-17 tanks. It moved by rail to Poland in June and later took part in the Russo-Polish War of 1919–21. Establishment of this unit, equipped with what at the time were among the most modern tanks, was enough to give Poland the fourth largest tank inventory in the world.

By September 1939, the situation had changed dramatically. Army mechanization in Germany and the Soviet Union had far eclipsed that in Poland and together they would commit over 6,000 tanks against Poland's approximately 750 armored vehicles. Nevertheless, Polish armor played a vital supporting role in the campaign. Their mobility was an especially important asset in the dynamic campaign waged by the Germans and Soviets. Greatly outnumbered, attacked on multiple fronts, and hampered by outdated doctrine, Polish armored units made brave attempts to stem the invaders. Their actions offered a preview of the nature of the armored combat to follow in France.

The main elements of the Polish armored forces were the light tank, tankette – a small, fast, lightly armored tracked vehicle typically with a crew of two and armed with a single machine gun – armored car, and (beyond the scope of this volume) the armored train.

ORGANIZATION

During peacetime, Poland's armor was organized into eleven armored battalions subordinate to three armored groups. These battalions were not combat formations, but administrative groupings used to conduct training, prepare forces for mobilization, and provide essential logistical support. During mobilization, these battalions were disbanded and their equipment and personnel reorganized, typically into several wartime units. These wartime units were then released to their new parent units. While perhaps expedient during peacetime, this arrangement required units to attempt to link up with the formations with which they were supposed to go to war and

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Polish FT-17s at the Biedrusk proving ground. The tank at the far right in the second photo is the Type M prototype. (Both Adam Jońca)

undoubtedly hindered their training as an integrated part of those larger formations.

Equipment in the armored battalions was assigned to one of three categories. Category A was war reserve equipment, not used for training. Category B contained equipment used for training, but that would be mobilized in case of war. Category C consisted of equipment used for instructional purposes and not fit for wartime use.

Any equipment that was not mobilized was sent to Reserve Centers. Some of this equipment, including old or worn out vehicles, was formed into small, ad-hoc units in response to the dire situation during the campaign. Other provisional units were also created as noted elsewhere in the text.

The principal wartime units (see Appendix) included:

- Light tank battalions equipped with either 7TP or R-35 tanks
- Armored *dywizjons*, battalion-sized units equipped with armored cars and tankettes that were assigned to the cavalry brigades
- Independent reconnaissance tank companies and a similarly-organized reconnaissance tank company, both equipped with tankettes
- Light tank companies equipped with either Vickers E or FT-17 tanks

As with any military organization, on-hand equipment – especially support equipment such as trucks – could vary both in number and type from that officially authorized. Particular care must be exercised regarding the 21st Light Tank Battalion, equipped with R-35s. Its mobilization base was not fully prepared to field it and it was only partially formed at the start of the war. Organizationally, the 21st was a hybrid of the standard French and Polish light tank battalions and it was short of many of the trained personnel and vehicles it was authorized. It also possessed a mix of modern and obsolete support vehicles of French, Czech, US as well as Polish origin. The table for this unit should therefore be regarded as a notional depiction of how it was actually fielded rather than its theoretical structure.

The table below shows the distribution of armored equipment at mobilization.

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Unit	Subordinate armored unit	Equipment							
		TK-3	TKS	7TP	Vickers	FT-17	R-35	wz. 34	wz. 29
10th Cavalry Brigade	121st Light Tank Co				17				
	101st Recon Tank Co	9	4 w/ 20mm						
	Recon Tank Squadron		13 (4 w/ 20mm)						
Warsaw Armored-Motorized Brigade	12th Light Tank Co				17				
	11th Recon Tank Co		13 (2 or 4 w/ 20mm)						
	Recon Tank Squadron		13 (2 or w/ 20mm)						
Mazowiecka Cavalry Brigade	11th Armored Dywizjon	13							8
Wołyńska Cavalry Brigade	21st Armored Dywizjon		13					8	
Suwalska Cavalry Brigade	31st Armored Dywizjon		13					8	
Podlaska Cavalry Brigade	32nd Armored Dywizjon		13					8	
Wileńska Cavalry Brigade	33rd Armored Dywizjon		13					8	
Krakowska Cavalry Brigade	51st Armored Dywizjon	13						8	
Kresowa Cavalry Brigade	61st Armored Dywizjon		13					8	
	42nd Indep Recon Tank Co	13						8	
Podolska Cavalry Brigade	62nd Armored Dywizjon		13					8	
Wielkopolska Cavalry Brigade	71st Armored Dywizjon	9	4 w/20mm					8	
Pomorska Cavalry Brigade	81st Armored Dywizjon	9	4 w/20mm					8	
Nowogródzka Cavalry Brigade	91st Armored Dywizjon	13						8	
25 Infantry Division	31st Indep Recon Tank Co		13						
1st Cavalry Regt/ KOP	32nd Indep Recon Tank Co		13						
10th Infantry Division	91st Indep Recon Tank Co	13							
	92nd Indep Recon Tank Co	13							
30th Infantry Division	41st Indep Recon Tank Co	13							
Army "Krakow"/ Operational Group "Bielsko," later 21st Mountain Infantry Division	51st Indep Recon Tank Co	13							
Army "Krakow"/ Operational Group "Silesia"	52nd Indep Recon Tank Co								
Army "Krakow," later 1st Mountain Brigade	61st Indep Recon Tank Co		13						
20th Infantry Division	62nd Indep Recon Tank Co		13						
8th Infantry Division	63rd Indep Recon Tank Co		13						
14th Infantry Division	71st Indep Recon Tank Co	13							
15th Infantry Division	81st Indep Recon Tank Co	13							
26th Infantry Division	82nd Indep Recon Tank Co	13							
	72nd Indep Recon Tank Co	13							
Reserve Army "Prussia"	1st Light Tank Bn			49					
Reserve Army "Prussia"	2nd Light Tank Bn			49					
C-in-C Reserve	21st Light Tank Bn						45		
C-in-C Reserve	111st Light Tank Co					15			
C-in-C Reserve	112nd Light Tank Co					15			
C-in-C Reserve	113rd Light Tank Co					15			

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TANKS

FT-17

FT-17 Specifications	
Length	4.1m
Width	1.74m
Height	2.14m
Combat weight	6,500kg (MG)/6,700kg (cannon)
Engine	39hp, 4-cylinder, gasoline
Speed	7.8km/h
Range	35km (road); 20km (cross-country)
Ground clearance	43cm
Armor	Turret side: 16mm (octagonal); 22mm (cast) Hull front: 8–16mm; side and rear: 16mm; top 8mm; bottom: 6mm
Armament	One wz.18 (***wzór*** – Pattern) 37mm Puteaux SA 18 cannon with 237 rounds or one 7.92mm wz. 25 Hotchkiss machine gun with 4,800 rounds
Crew	2 (driver, commander/gunner)

The FT-17 was the first modern tank, with a rotating turret (Poland used FT-17s with both the round, cast Girod turret and the octagonal turret constructed of flat plates in the campaign) and the engine at the rear and separated from the crew compartment by a bulkhead. It was armed with either a 37mm Puteaux SA 18 cannon or a 7.92mm Hotchkiss machine gun. The 37mm Puteaux was a reliable, accurate weapon with a maximum effective range of 1,200m and practical rate of fire of ten rounds per minute. The gunner aimed the weapon using his shoulder. Its primary role was to engage soft targets such as infantry, but its armor-piercing round was still effective against many of the lightly armored vehicles it faced in 1939. Rechambering the original 8mm Hotchkiss to fire the 7.92mm ammunition used by the Polish military, however, caused reliability and other problems.

A simple and reliable vehicle, the FT-17 gave good service in the Russo-Polish War. Poland experimented with a number of modifications, most notably to the tracks, in order to improve mobility and fuel consumption. The most significant of these modified vehicles was the Type M. It featured redesigned hull armor, smaller track links, a larger fuel tank, and alterations to the cooling, fuel, and exhaust systems. While the changes improved many aspects of the original FT-17, they did not justify the expense and the Type M did not enter production. In addition, the Poles acquired five M26/27 and one NC1 tanks – essentially FT-17s with a modernized suspension – for testing.

However, the limitations of the basic FT-17 design became apparent and consideration of establishing an indigenous production line was dropped. The *Centralne Warsztaty Samochodowe* (CWS – Central Car Workshops) did produce 27 FT-17s using spare parts and mild steel plates. They were used for training and exercises to save wear on the fully armored vehicles intended for combat. By 1939, many FT-17s had been sold off and exported or otherwise withdrawn from service. However, 102 were still in the inventory, 70 with the peacetime 2nd Armored Battalion and 32 assigned to armored train units. Upon mobilization, the tanks from the 2nd Armored Battalion formed three independent tank companies – the 111th, 112th, and 113th – of 15 tanks each, held under the control of the commander-in-chief as a strategic reserve.

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LEFT
One of the 27 FT-17s produced by the Central Car Workshops (CWS). The small track links were intended to address two of the FT-17's shortcomings – low speed and high fuel consumption. They provided greater fuel efficiency, but increased the vehicle's speed only marginally. The new tracks also reduced noise and vibration, which improved the crew's endurance. (Hugo Jaeger)

RIGHT
A dug-in FT-17, part of the defenses of the Brzesc fortress. (Adam Jońca)

In Combat

Following mobilization, the 111th Company was moving by train when bombing raids near Łuków forced the train to halt. The tanks left the train and the company subsequently lost two tanks in an engagement with German armor. Separated from friendly forces and forced to withdraw, the remainder were captured after being abandoned due to lack of fuel. The other two companies – the 112th and 113th – took part in the defense of the Brzesc fortress, the 112th serving largely in a static role and 113th patrolling in the vicinity of the fortress. The tanks of the 113th Company were almost all lost in action on September 14, two days before the fall of the fortress.

A small provisional unit, formed from the FT-17s remaining at their mobilization base, took part in the defense of Przemyśl.

They also saw service providing reconnaissance for the armored trains. For this purpose, a two-axle rail carriage was developed to carry the FT-17, a combination known as the "medium rail-and-ground armored draisine R". It was powered by the tank's engine and ramps enabled the tank to dismount from the carriage if necessary. Nine of the ten armored trains each had two draisine Rs with cannon-armed FT-17s.

A

TANKS: VICKERS E, R-35, AND FT-17

1: The single-turret Vickers E. The Vickers E, although a solid design of the late 1920s, wasn't adopted by the British Army and was offered on the export market. Poland purchased the twin-turret version armed with only machine guns, but quickly decided to upgrade 22 of them with larger Vickers turrets armed with a 47mm cannon. The large air intakes on the side meant to address engine overheating problems clearly distinguish the Polish Vickers from the British original.

2: This shows the R-35. The R-35 was not the vehicle the Poles were seeking; it had the same two-man crew and inadequate 37mm cannon as the FT-17. It was, however, available for purchase. The first shipment of one battalion arrived just before the start of the campaign and too late to be properly integrated into the force structure; the second battalion was shipped but not delivered by the time Poland fell. The chaotic events of the few weeks between their arrival and the outbreak of hostilities prevented their being repainted and they served, as illustrated here, wearing their original French camouflage colors and tactical markings. They had essentially no combat role in the fighting.

3: The FT-17, depicted here, was the same vehicle as used in World War I. The Poles employed it in the Russo-Polish War of 1919–21 and subsequently evaluated a number of modifications to extend its service life. Due to financial pressures, none of the more extensive modifications were adopted and only some of the vehicles received new, smaller track links to improve the quality of its ride. Moreover, the fundamental limitations of the original design had become clear and emphasis was placed on fielding more modern types. Some were sold off and exported, while others soldiered on in a training role. Three companies were still in the force structure at the outbreak of the war and served in roles where their limited mobility would not be taxed.

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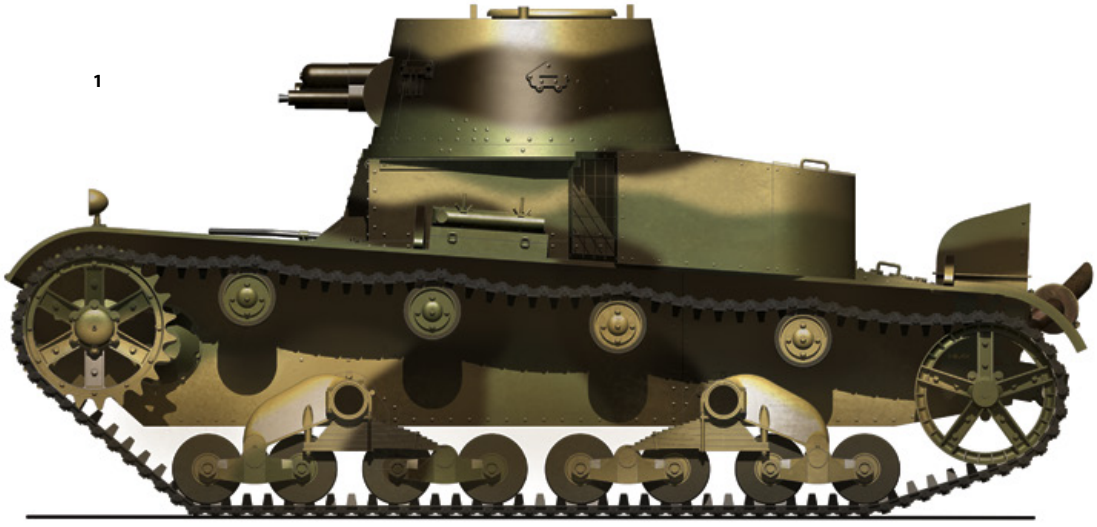

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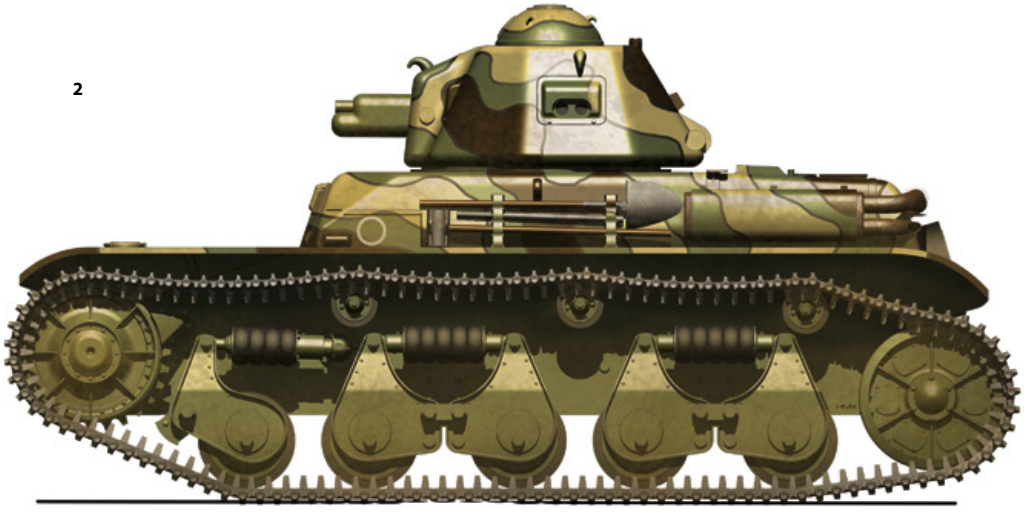

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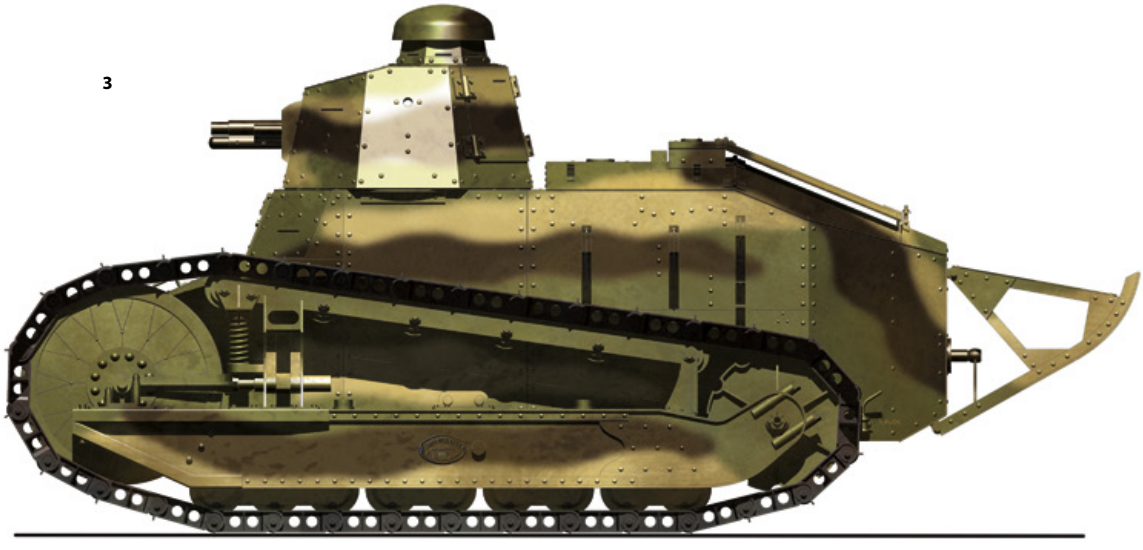

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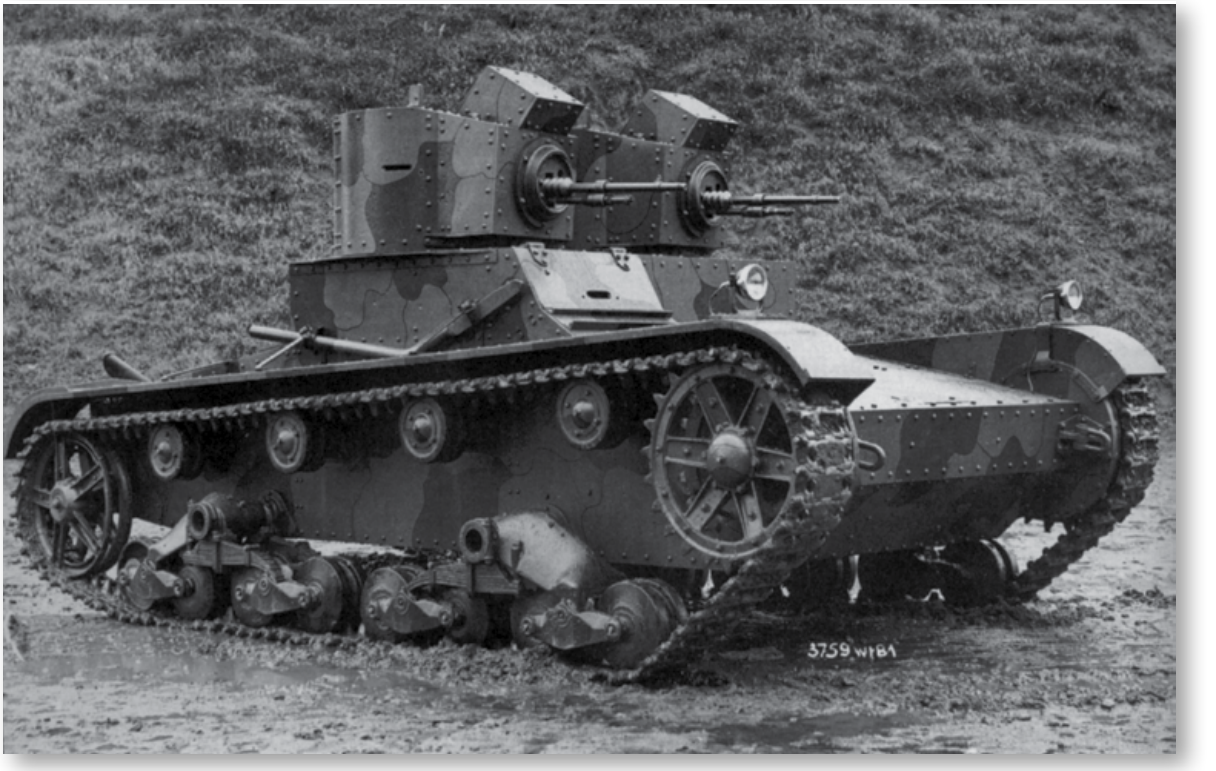
Vickers E

Vickers E Type A/Type B Specifications	
Length	4.88m
Width	2.41m
Height	2.08/2.17m
Combat weight	7,200kg/7,350kg
Engine	91hp, 4-cylinder, gasoline
Speed	37km/h
Range	160km (road); 80–90km (cross-country)
Ground clearance	38
Armor	Turret side: 13mm Hull front and crew compartment side: 13mm Hull rear and engine compartment side: 8mm Top and bottom: 5mm
Armament	Two 7.92mm wz. 30 Browning machine guns with 13,200 rounds/One Vickers-Armstrong QF 47mm with 49 rounds and one 7.92mm wz. 30 Browning machine gun with 5,940 rounds
Crew	3 (driver, gunner, commander-gunner)/(driver, gunner, and commander-loader)

The twin-turret Vickers, each turret armed with a 7.92mm wz. 25 Hotchkiss machine gun. It has the pre-1936, so-called "Japanese," camouflage pattern. The large box-shaped extensions of the turret roof armor were unique to the Polish Vickers and accommodated the box magazines of the 13.2mm Hotchkiss machine gun. (Centralne Archiwum Wojskowe)

The war of maneuver that characterized the 1919–21 conflict with Russia led Poland to recognize early the need to replace its obsolescent FT-17s. After attempts to acquire the innovative US-designed Christie failed, attention turned to the Vickers-Armstrong Six-Ton Tank, also known as the Vickers Mark E, developed as a private venture by the company. In 1930, Poland conducted evaluation trials. Although there were problems with the engine overheating, the trials were generally successful and, in 1931, Poland placed an order for 38 twin-turret tanks – designated Vickers E Type A or



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Another twin-turret Vickers (left), one of 16 armed with the 13.2mm Hotchkiss machine gun in the right turret and the more modern 7.92mm wz. 30 Browning machine gun in the left turret. The 13.2mm round had little armor penetration capability and the twin-turret Vickers standard armament became two wz. 30 Brownings (right). (Both Narodowe Archiwum Cyfrowe)

dwuwieżowy (abbreviated dw) – that included a license for domestic production. Delivery was completed in 1934.

The tank's most advanced feature was its suspension. It consisted of two bogie wheel units, each with four road wheels and a leaf spring, on either side that gave a smooth ride. The tank's turrets were designed to mount a variety of weapons currently in Polish service. Externally, the most distinctive features were the large box-like structures on the top of the turrets. These were designed to accommodate the 13.2mm Hotchkiss heavy machine gun, which was fed from a magazine inserted in the top of the weapon. Vickers was unable to meet the contract specifications for armor thickness, but the Poles felt compelled to accept the vehicles in order to quickly acquire at least some modern tanks. Four tanks – the company and platoon commander's vehicles – in one company were fitted with RKBc radios prior to the campaign.

An attempt was made to address the engine overheating problems by relocating the oil cooler and improving airflow through the engine compartment. Replacing the engine was considered, but not undertaken for reasons of cost.

Experience with the 13.2mm Hotchkiss and 37mm Puteaux cannon fitted to some vehicles led to a decision, in 1934, to rebuild them as Vickers E Type B or *jednowieżowy* (jw) single-turret tanks. This version featured a large turret armed with a 47mm cannon and coaxial 7.92mm wz. 30 Browning machine gun. The necessary conversion was simple and could be completed in the battalion workshops. Only 22 vehicles were rebuilt as the performance of the low-velocity 47mm cannon proved disappointing.

In Combat

On mobilization, the Vickers were organized into two companies, the 121st Light Tank Company, part of the 10th Cavalry Brigade (Motorized), and the 12th Light Tank Company subordinate to the Warsaw Armored-Motorized Brigade.

The 121st – serving as the brigade's reserve force and probably understrength – counterattacked elements of the 2nd Panzer Division on September 3 and checked the enemy's advance. Over the next three days, it

LEFT
The single-turret Vickers, armed with a 47mm cannon and coaxial 7.92mm wz. 30 Browning. Clearly visible here is one of the two large side-mounted air intakes, another feature unique to Polish Vickers, that were added to address the engine's tendency to overheat. (Narodowe Archiwum Cyfrowe)

RIGHT
A knocked-out single-turret Vickers from the 12th Company. (Adam Jońca)

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lost three tanks in engagements with elements of the 4th Light Division while claiming three German tanks and two armored cars destroyed. A communications failure caused the company to lose contact with the brigade and their fuel supply. Refueling difficulties resulted in the company becoming separated into two groups. One group of three tanks was attached to the 21st Mountain Infantry Division, where they served as a reserve force, supported counterattacks, and defended the division headquarters. One was lost to artillery fire and the other two were captured when the division surrendered on September 16 after being encircled. The other group with the remaining tanks of the company operated in support of the 6th Infantry Division. This group lost three Vickers during defensive actions at Kolbuszowa and another four between September 17 and 20 before the last two surrendered with the remnants of the 6th Division.

The 12th Light Tank Company had an inauspicious debut, losing two tanks to antitank guns of the 4th Light Division during a counterattack before coming under friendly fire while returning from the attack. As the Warsaw Armored-Motorized Brigade withdrew, the Vickers fought several engagements and six tanks were abandoned due to mechanical problems. The rest of the tanks were destroyed during the fierce fighting at Tomaszów Lubelski.

Three twin-turret Vickers tanks in Reserve Center No. 3 were organized into a provisional platoon and, along with 7TP tanks, tankettes, and armored cars, attempted to escape into Hungary. None did so. Similarly, Reserve Center No. 1 formed a composite unit consisting of one Vickers E and some tankettes that also attempted to reach Hungary, but the Vickers was lost in a clash with Soviet armor.

7TP

The deficiencies of the Vickers being well known, concurrent with their acquisition work started on an improved indigenous design that fully met Polish requirements. The first prototype (known as the VAU-33 – Vickers Armstrong Ursus 1933) was completed in 1934. Series production was authorized later that year as the 7TP (7 Ton Polish). Compared to the Vickers, the 7TP had thicker armor, an upgraded version of a license-produced Swiss Saurer diesel engine, a redesigned clutch and gearbox, and a strengthened Vickers-Armstrong suspension.

The two VAU-33 prototypes and first series-production 7TPs used the turrets made available by the conversion of 22 twin-turret Vickers to the single-turret model. One other twin-turret Vickers was converted to 7TP

LEFT
An early production twin-turret 7TP. (Janusz Magnuski collection)

RIGHT
Negotiating antitank obstacles during testing. Early production 7TPs had large engine compartment louvers in the rear armor plate. (Centralne Archiwum Wojskowe)

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Both twin- and single-turret 7TP were equipped with radios – note the antenna masts. The single-turret 7TP is being tested against Czech antitank obstacles. (Jan Tarczyński/ Adam Jońca)

7TP Specifications (twin turret/single turret)		
Length	5.75m	
Width	2.4m	
Height	2.18m/2.27m	
Combat weight	9,400kg/9,900kg	
Engine	Saurer 110hp, 6-cylinder, diesel	
Speed	32km/h	
Range	150km (road); 130km (cross-country)	
Ground clearance	37cm	
Armor	Turret side:	13mm/15mm
	Turret front:	15mm/15–18mm
	Hull side:	9–17mm
	Hull front:	10–17mm
	Hull rear:	6–9mm/9mm
	Top and bottom:	5mm/5–10mm
Armament	Two wz. 30 7.92mm Browning machine guns with 6,000 rounds/One Bofors 37mm with 80 rounds and one wz. 30 7.92mm Browning machine gun with 3,960 rounds	
Crew	3 (driver, gunner, commander-gunner)/(driver, gunner, and commander-loader)	

7TPs of the 1st Light Tank Battalion destroyed near Tomaszów Lubelski, their last battle. The triangular signal flags above the nearest vehicle are "Slupski shields," the standard means of communication between vehicles without radios. When raised through a port on the roof, two spring-loaded arms opened to ensure the flag could be easily seen, even in still air. Later production 7TPs such as these had solid rear armor plates instead of the vulnerable louvers of the early series. (Jacek Haber)

standard. This was only an interim measure pending introduction of a more modern single-turret design with a capable antitank weapon. After evaluating a number of different armament options in the mid-1930s, the Poles selected the Swedish Bofors 37mm, which was also entering Polish service as a towed antitank gun. Bofors developed a suitable turret that the Poles modified to suit their needs. The modifications included the addition of a turret bustle to house a radio set, which also served as crew intercom. Delivery of the NC/2 radios was slow, but unit commanders had radio-equipped tanks in one – and possibly both – 7TP battalions. A wz. 30 Browning machine gun was mounted coaxially and protected by a cylindrical armor protrusion on the mantlet. Seats for the gunner and commander-loader, who also operated the radio, were suspended from the turret roof. For observation, the commander-loader had an innovative Polish-designed Gundlach reversible periscope that enabled 360-degree viewing and the gunner both periscopic and telescopic sights. Armor was of rolled, and in critical areas, face-hardened plates bolted to a frame. Although

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A 2nd Light Tank Battalion 7TP. The 7TP's armor, although improved over the Vickers, could still be penetrated by 20mm and larger projectiles as shown by the hole in the frontal armor to the left of the driver's position. (Janusz Magnuski collection)

thicker than on the Vickers E, the armor was still vulnerable to armor-piercing ammunition of 20mm and greater.

In Combat

In September 1939, 7TPs equipped the 1st and 2nd Light Tank battalions assigned to Reserve Army Prussia. There were also two companies subordinate to the Warsaw Defense Command, one equipped with 11 single-turret tanks and the other with seven twin-turret and four single-turret tanks. Reserve Center No. 3 fielded a provisional unit equipped with eight twin-turret 7TPs.

The battalions moved repeatedly in response to the changing situation and were employed piecemeal. The 1st Battalion's 1st Company engaged tanks and motorized infantry of the 1st Light Division, destroying three PzKpfw II and PzKpfw 35(t)s while losing two 7TPs, including the company commander's. The 2nd Company was then committed to the action, knocking out another seven tanks. Approximately ten tanks were lost on September 9, a number of them due to mechanical breakdown on the march. The 1st Battalion, in conjunction with infantry, conducted a successful attack against the town of Głowaczów, destroying a PzKpfw 38(t) and a PzKpfw IV. Seven tanks of the 2nd Company were committed to support the withdrawal of the 19th Infantry Division, but all had to be abandoned during an unsuccessful river crossing. With 24 remaining tanks, the battalion was attached to the Warsaw Armored-Motorized Brigade and moved to Tomaszów Lubelski. On September 18, the battalion conducted a successful attack, achieved its objective and continued its advance, destroying six tanks, four armored cars,

LEFT

German troops examine 7TPs of the 3rd Company, 2nd Light Tank Battalion. They were abandoned, their fuel and ammunition transferred to allow other tanks in the unit to continue. It was not uncommon for tanks to become separated from their logistical support in the fluid campaign. (Adam Jońca)

RIGHT

One of the 7TPs of Reserve Center No. 3, lost along its evacuation route. In the background, a TK-3 tankette. Those passing by are a reminder that the German army was heavily dependent on horses as a means of transport, especially at this early stage of the war. (Adam Jońca)

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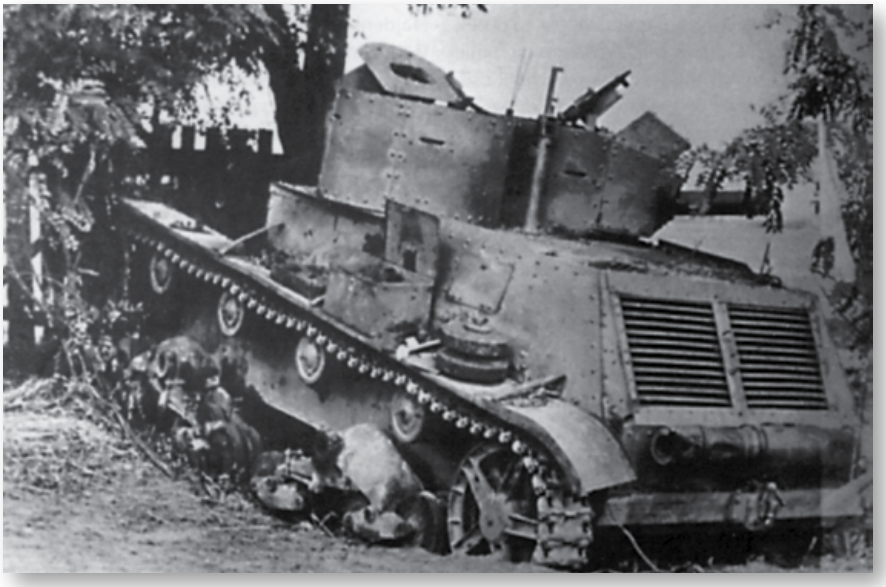

Tanks of the 1st Light Tank Company (left) and 2nd Light Tank Company (below) assigned to the Warsaw Defense Command. (Both Janusz Magnuski collection)

and a number of antitank guns and howitzers. However, the engagement cost ten tanks and a platoon-strength attack that night several more. A breakout attempt on September 19 failed, with four of the battalion's remaining seven tanks put out of action. The last three tanks were destroyed by their crews on the following day.

The 2nd Battalion's baptism of fire came on September 4 near Piotrków, when the 1st Company destroyed two armored cars of the 1st Panzer Division in a meeting engagement. As the action developed, they destroyed three PzKpfw Is and one PzKpfw II while losing only one 7TP. An attack by the remainder of the battalion the next day destroyed another four armored cars but foundered when it encountered antitank guns of the 4th Panzer Division. The 2nd Company launched an attack against a column of vehicles from the 12 Infantry Regiment/4th Panzer Division that virtually destroyed the enemy force. Having lost contact with the other friendly units and under pressure from other elements of the 4th Panzer Division, it was forced to withdraw. It left behind two destroyed tanks and five damaged tanks that could not be recovered. The battalion was ordered to withdraw and subsequently engaged in only minor skirmishes. After the Soviets entered the war, the battalion, located at Kowel, was ordered to cross into Hungary. Unable to undertake the march due to the poor mechanical condition of its vehicles, it was ordered to destroy its remaining tanks.

R-35s after crossing into Hungary. The R-35s arrived just prior to the campaign and saw relatively little action. (Adam Jońca)

The two companies assigned to the Warsaw Defense Command had their first action on September 9 in the city's western

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A Polish R-35. The Poles sought a more capable vehicle with better anti-armor capability, but the R-35s were what was available at the time. (Janusz Magnuski collection)

Ochota and Wola districts when they drove off attacks by the 4th Panzer Division, knocking out several German tanks. They counterattacked the next day and, that evening, one company participated in a reconnaissance mission to the northwest towards the Kampinos Forest. They were mistaken by the Germans for friendly tanks and not challenged, allowing the Poles to destroy three tanks at close range. An attack by both companies in the Włochy district on September 12 took the German forces by surprise, drove back one battalion and isolated a regimental command post. The tanks continued the attack, leaving their supporting infantry behind, but were halted when the 4th Panzer Division committed additional units to the fight. During the Germans' final assault on Warsaw, the remaining tanks counterattacked near the Zachodnia railway station in the city's eastern half. Nine 7TPs – five from the 1st Light Tank Company and four from the 2nd Light Tank Company – and two C7P recovery tractors were captured after the city's surrender.

B

TANKS: THE 7TP

1: This is the single-turret 7TP (7 Ton Polish), the most capable tank in Poland's inventory. It featured a new 37mm Bofors cannon with excellent performance against enemy armor, the proven Vickers suspension, and a number of improvements designed to overcome the limitations of earlier vehicles. These included a new engine to overcome overheating problems and a turret designed from the outset to accommodate a radio. Although its armor had also been slightly increased over the Vickers E, it still remained vulnerable to fire from even the smallest cannons. It wears the new soft-edge three-color camouflage scheme introduced in 1936 and used on all armored vehicles in the campaign except the R-35.

2 & 3: This shows the twin-turret 7TP armed only with machine guns. Twenty-three examples of this version were built: one was a conversion of a twin-turret Vickers E to 7TP standards and the other 22 were built as 7TPs, but using turrets made available by the upgrade of Vickers Es to a single-turret configuration. This was merely an expedient while Poland searched for a suitable cannon and a new turret was designed. The Hotchkiss machine guns originally mounted in the twin-turret Vickers E have been replaced by the more reliable Brownings fitted with light armored covers over the water-cooling jackets. Despite the archaic twin-turret layout, it remained in service throughout the campaign, as did its twin-turret Vickers E counterpart.

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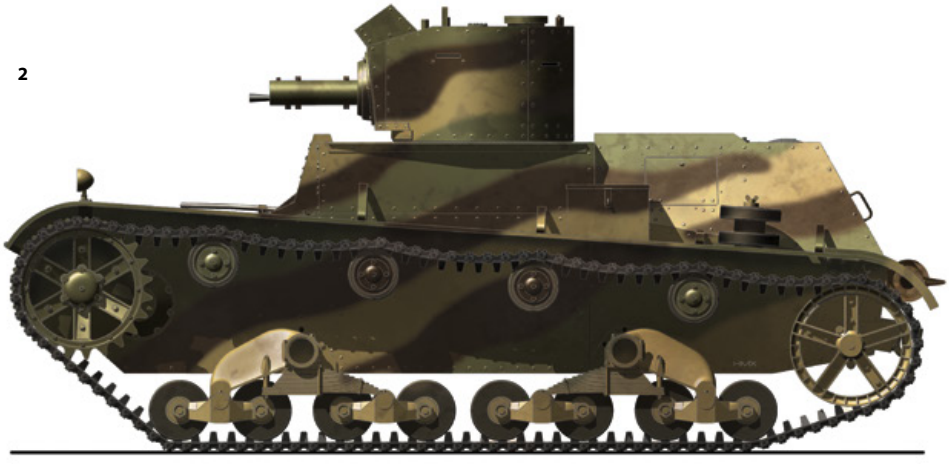

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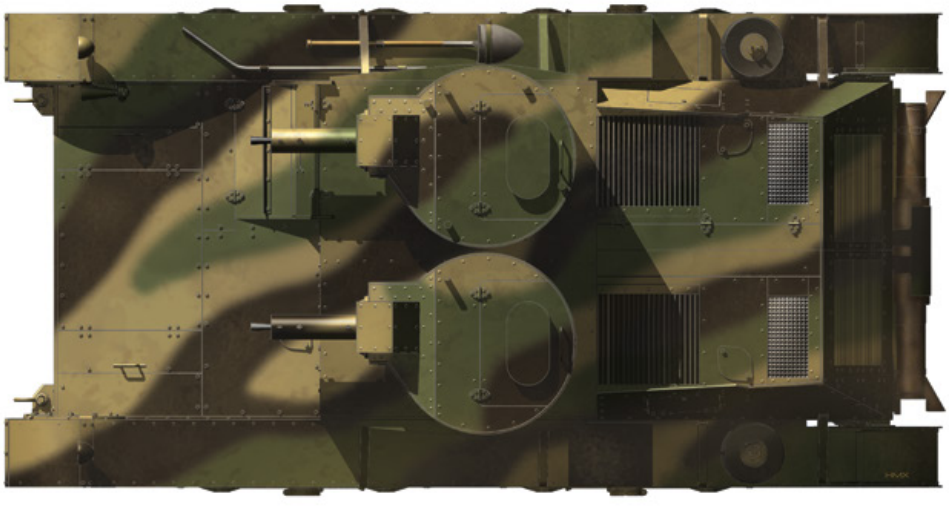

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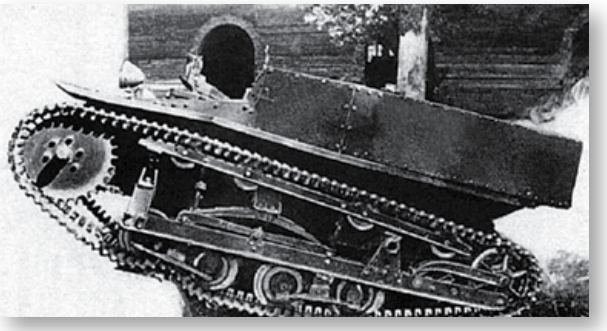

Carden-Loyds armed with 7.92mm Maxim machine guns (left). Its open top (armored hoods would later be offered on export models) and stiff suspension were disadvantages. The Poles mounted the bogie units on a leaf spring, greatly improving the quality of the ride; return rollers were also added (right). This basic suspension design would be used on subsequent Polish tankettes. (Adam Jońca/ www.derela.republika.pl)

Reserve Center No. 3, in addition to the Vickers tanks mentioned in the previous section, contained eight twin-turret 7TPs. Most were lost to mechanical problems as they tried to reach Hungary and the final two tanks were destroyed in a clash with Soviet armor.

R-35

R-35 Specifications	
Length	4.02m
Width	1.85m
Height	2.07m
Combat weight	10,600kg
Engine	82hp, 4-cylinder, gasoline
Speed	19km/h
Range	138km (road); 80km (cross-country)
Ground clearance	32cm
Armor	Turret front: 45mm; side and rear: 40mm; top: 30mm Hull front: 32mm; side and rear: 44mm; top and bottom: 14–15mm
Armament	One 37mm Puteaux SA 18 cannon with 100 rounds and one 7.5mm Reibel machine gun with 2,980 rounds
Crew	2 (driver, commander/gunner)

The R-35 was designed by Renault as a replacement for the FT-17. Like the FT-17, it had a two-man crew, was armed with the 37mm Puteaux SA 18 cannon, and was relatively slow. Off-road performance was poor. The R-35 had cast armor, an innovative feature at the time, but it performed poorly against 37mm projectiles in tests.

As it was unable to increase production of the 7TP and the French were unwilling to sell the Somua S-35, Poland ordered 100 R-35s and three

The TK-2 (left) can be identified by its front-mounted drive sprocket and hatches. The TK-1 (center) had the drive sprocket at the rear. Both are armed with a 7.92mm Hotchkiss wz. 25 machine gun and, after maneuvers in 1930, were fitted with an armored roof. The expansion of the TK designation is not positively known, but may refer to the principal designers, Major Wladyslaw Trzeciak and Captain Edward Karkoz, or the Polish word for tankette (*tankietka*). To the right are several Carden-Loyd tankettes. (Adam Jońca)

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H-35s for evaluation purposes from France in the spring of 1939. In July, the first batch of 49 R-35s were delivered and, following much abbreviated crew training, 45 were assigned to the 21st Light Tank Battalion upon mobilization. The second batch left France on September 15, but the campaign ended before delivery could be completed.

In Combat

As noted previously, the battalion went through a difficult mobilization period. The battalion was short of equipment, vehicle manuals needed to be translated from the original French, and it had only one month to train on its new equipment. After mobilization, the battalion was ordered to join the 10th Cavalry Brigade, but transportation difficulties prevented it from reaching the brigade. It was subsequently ordered to set up defensive positions near the Romanian border and the battalion's reserve tanks were detached to guard the Dnieper River crossings at Nizniow. The Soviet invasion on September 17 prompted another change in plans and the battalion was ordered to cross into Romania, a move it completed on the 18th (three tanks crossed the border into Hungary). The battalion's reserve tanks skirmished with Ukrainian militia while moving to rejoin the battalion.

Three of the four remaining R-35s (one R-35 had been damaged earlier during training and could not be repaired) and the three H-35s were formed into a composite unit. The unit served as a covering force for other units moving into Romania. It fought a successful engagement with German forces and destroyed one PzKpfw II while losing one tank. In a second engagement with Soviet forces, another tank was destroyed by fire from a SU-1-12 self-propelled gun. Two other vehicles were lost to mechanical problems and two were destroyed by their crews, one after being damaged and the other due to lack of spare parts and fuel.

TK-3s on parade pass by the Great Barbican of Kraków in the spring of 1939. The standing commander/gunner gives a good idea of the vehicle's diminutive size. The TK-3's size and poor visibility when closed down required taking this exposed stance to maintain situational awareness while moving through tall vegetation or standing crops. (Narodowe Archiwum Cyfrowe)

TANKETTES

The tankette was in vogue as the armies of Europe rearmed and mechanized in the 1930s. It was also relatively inexpensive, an important consideration for the time. Employed as a weapons carrier, reconnaissance vehicle, artillery tractor, and transport, the tankette entered into service in large numbers in Russia, Great Britain, Italy, France, and Poland. Many were based on the widely exported Carden-Loyd tankette, designed in Great Britain and the most advanced of its type.

A TK-3 with a tracked trailer. Each of the two platoons in a tankette company had one such trailer, used to transport repair parts that could be installed in 30 minutes or less. (www.derela.republika.pl)

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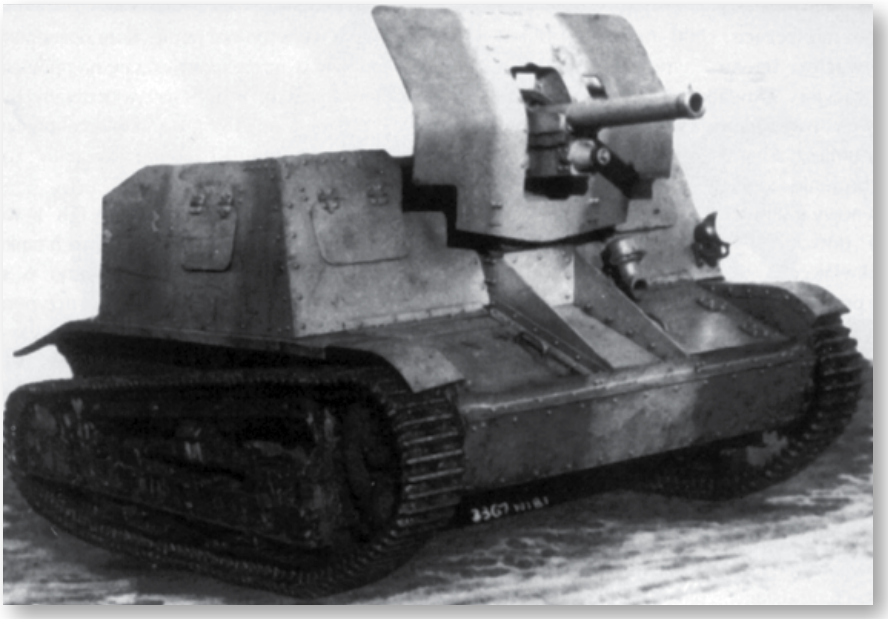

The TKD. The low sides and open top would have offered only limited protection for the crew, even if the vehicle had been constructed of armor plate rather than mild steel. (www.dobroni.com)

Development and acquisition of tankettes by Poland began with the purchase and evaluation of a single Carden-Loyd Mk VI in 1929. Ten were purchased that same year for operational testing during exercises and Poland acquired a license for domestic production. While exercises validated the utility of tankettes, the Carden-Loyd's suspension gave a harsh ride that was quickly fatiguing to the crew. The Poles modified the suspension by mounting the bogie units on a semi-elliptical leaf spring and adding return rollers. Only two Carden-Loyd Mk VIs were produced, both in mild steel, and efforts shifted to development and production of a domestic tankette design.

The State Engineering Works (PZInż.) constructed two prototypes, the TK-1 and TK-2, in 1930. Although similar in configuration to the Carden-Loyd Mk VI, they were both new designs and featured improved tracks and

C

TANKETTES

1: The TK-3. An indigenous, improved development of the British Carden-Lloyd Mark VI, ten of which the Poles purchased, the TK-3 was inexpensive and easy to manufacture, both important considerations in prewar Poland. While it did increase the total number of armored vehicles available – it was the most numerous type in service – and provide the Army useful experience in operating and maintaining armored vehicles, it had limited combat value. With thin armor and armed only with a machine gun, they were destroyed in large numbers when facing troops armed with more than small arms.

2: The TKS, shown here, was an improved version of the TK-3. It had thicker armor, a better ballistic shape, and a more powerful engine than its predecessor. Most were armed with the same single machine gun as the TK-3. However, as shown here, some were equipped with a magazine-fed 20mm cannon to provide an anti-armor capability. This weapon, given the relatively thin armor protection of the tanks of this era, made the TKS an important combat vehicle. While at one point rearming the entire tankette fleet with this weapon was considered, production delays and the timing of its introduction resulted in only a handful of TKS tankettes receiving them.

3: This is the TKSD. It was one of two attempts – the other being the TK-3-based TKD – to develop a support vehicle on a tankette chassis; both were assigned to the 10th Cavalry Brigade. With a low silhouette and the same 37mm Bofors cannon that equipped the single-turret 7TP, it was an effective tank destroyer. Only two were produced.

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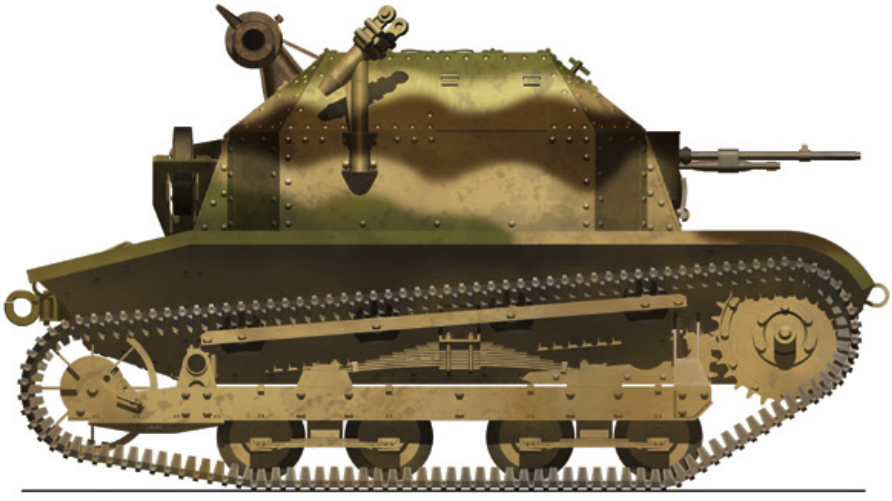

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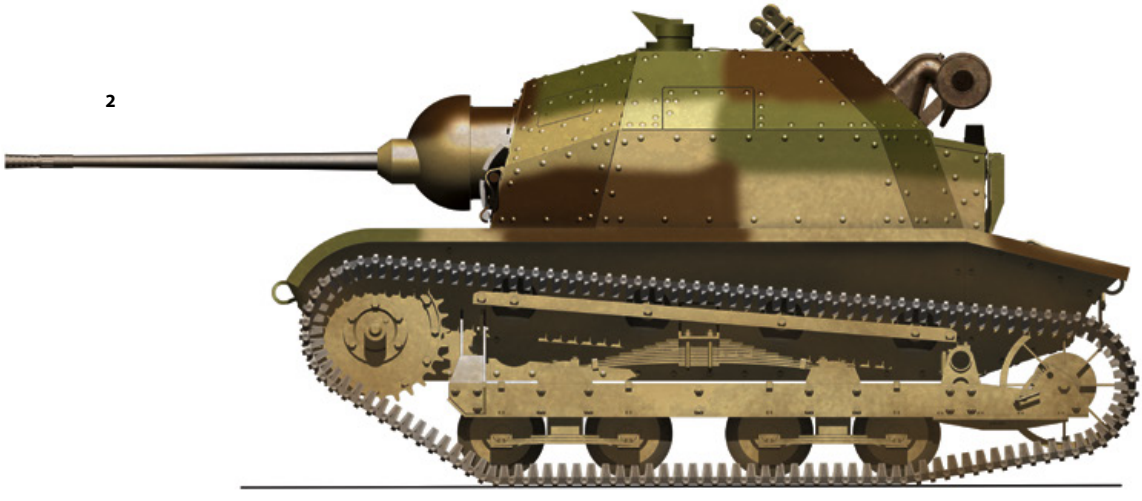

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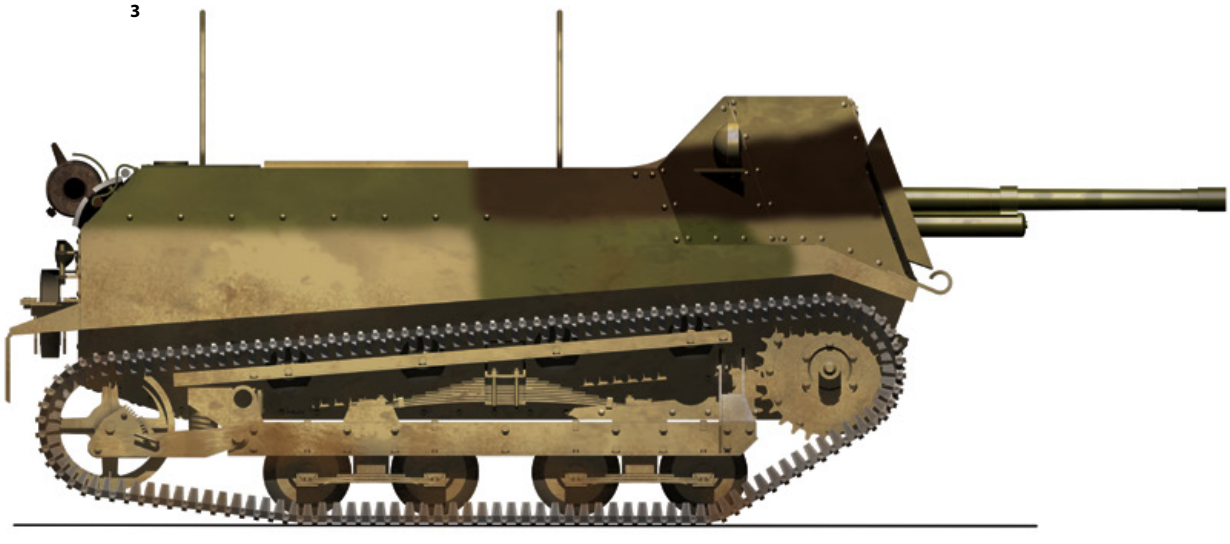

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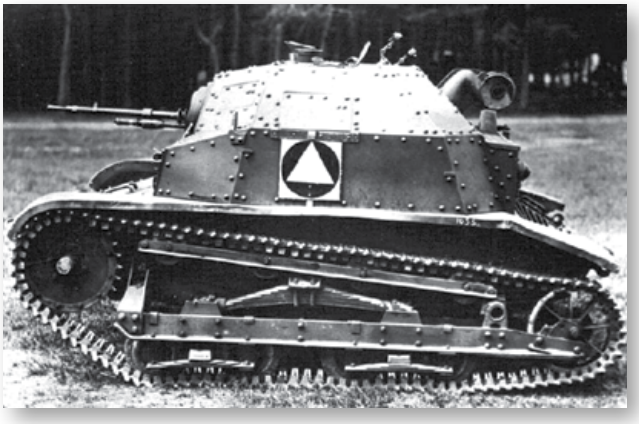
These two photographs show TKFs belonging to the 10th Cavalry Brigade – the Black Brigade – whose personnel are readily identifiable by their black leather coats and WWI-era German helmets. They were taken in late 1938 during operations in which Poland compelled Czechoslovakia to cede several portions of its territory along the border that had ethnic Polish majority populations. (Jerzy Majka)

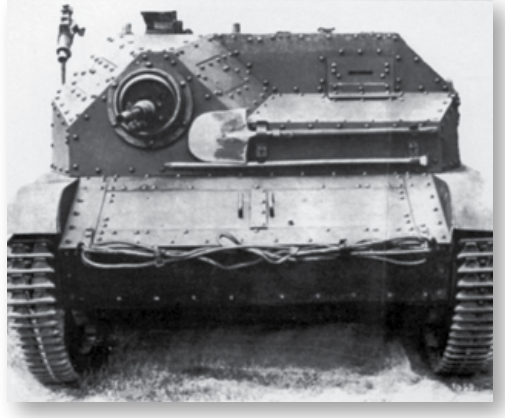
a modified suspension similar to that used earlier. The TK-1 had the drive sprocket at the rear and a Ford Model A engine, while the TK-2 had the drive sprocket at the front like the Carden-Loyd and a much less powerful Ford Model T engine. Exercises in the summer of 1930 with the TK-1, TK-2, and Carden-Loyd Mk VI resulted in additional refinements to the cooling, steering, and suspension systems as well as a fully enclosed armored body. The improved prototype, designated TK-3, was delivered in early 1931 and formally adopted for service later that year.

TK-3

TK-3/TKS Specifications	
Length	2.58m
Width	1.78m/1.79m
Height	1.32m
Combat weight	2,430kg/2,585kg
Engine	40hp, 4-cylinder, gasoline/45hp, 6-cylinder, gasoline
Speed	46km/h/45km/h
Range	200km/180km (road); 100km/110km (cross-country)
Ground clearance	30cm/32cm
Armor	Side: 8mm/5–8mm Front: 6–8mm/6–10mm Rear: 6–8mm/5–8mm Top: 3–4mm/3–6mm Bottom: 4mm/4mm
Armament	One 7.92mm wz. 25 Hotchkiss machine guns with 1,800 rounds
Crew	2 (driver, commander/gunner)

The series-production version of the TKS. It represented an improvement over the TK-3 in virtually all respects, except the armament, having the same marginally satisfactory Hotchkiss machine gun. One of the new features was the Gundlach periscope, which allowed for a 360-degree view and necessitated lowering the muffler position so as not to obscure the commander/gunner's rearward vision. (Janusz Magnuski collection/Janusz Ledwoch)





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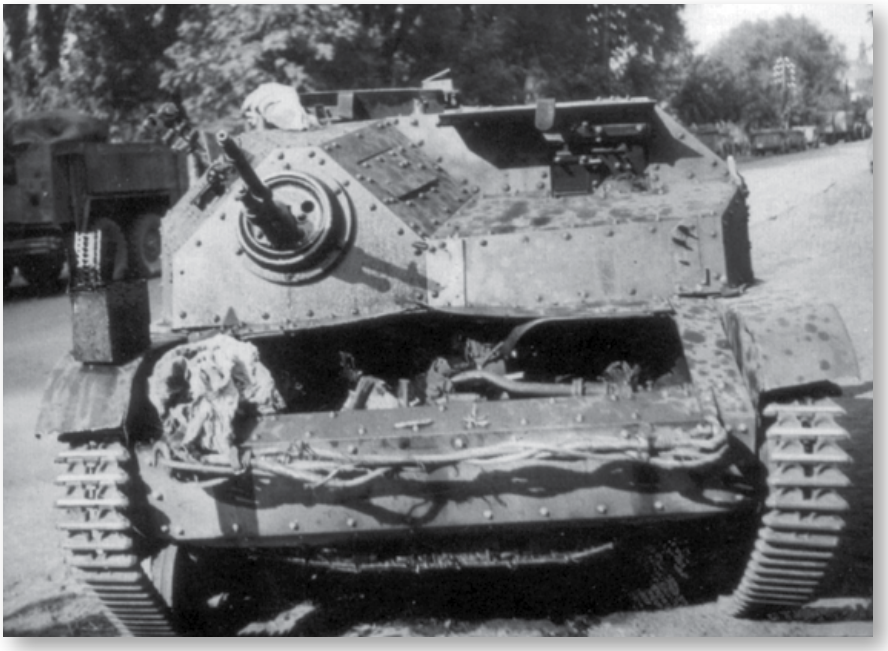

Despite the increase in armor protection, the TKS remained extremely vulnerable to cannon fire. This TKS was knocked out after being hit on the glacis. (Wawrzyniec Markowski)

The first 15 series-production vehicles were constructed of mild steel and used for training and as the basis for other tankette variants. Another 285 TK-3s were constructed of armor plate by August 1932.

The TK-3's two-man crew sat on either side of the engine, with the fuel tank immediately behind the commander/gunner. The vehicle's light armor was proof against small arms fire and mortar and grenade fragments but not armor piercing ammunition of any type. An antiaircraft mount was fitted to the right side of the vehicle.

They were favorably received by their crews and noted for their speed and stealth due to their small size. They were very maneuverable, had low ground

A destroyed TKS. The vertical mount on the right side of the vehicle with "U"-shaped yoke enabled the machine gun to be used in an antiaircraft role. (Adam Jońca)

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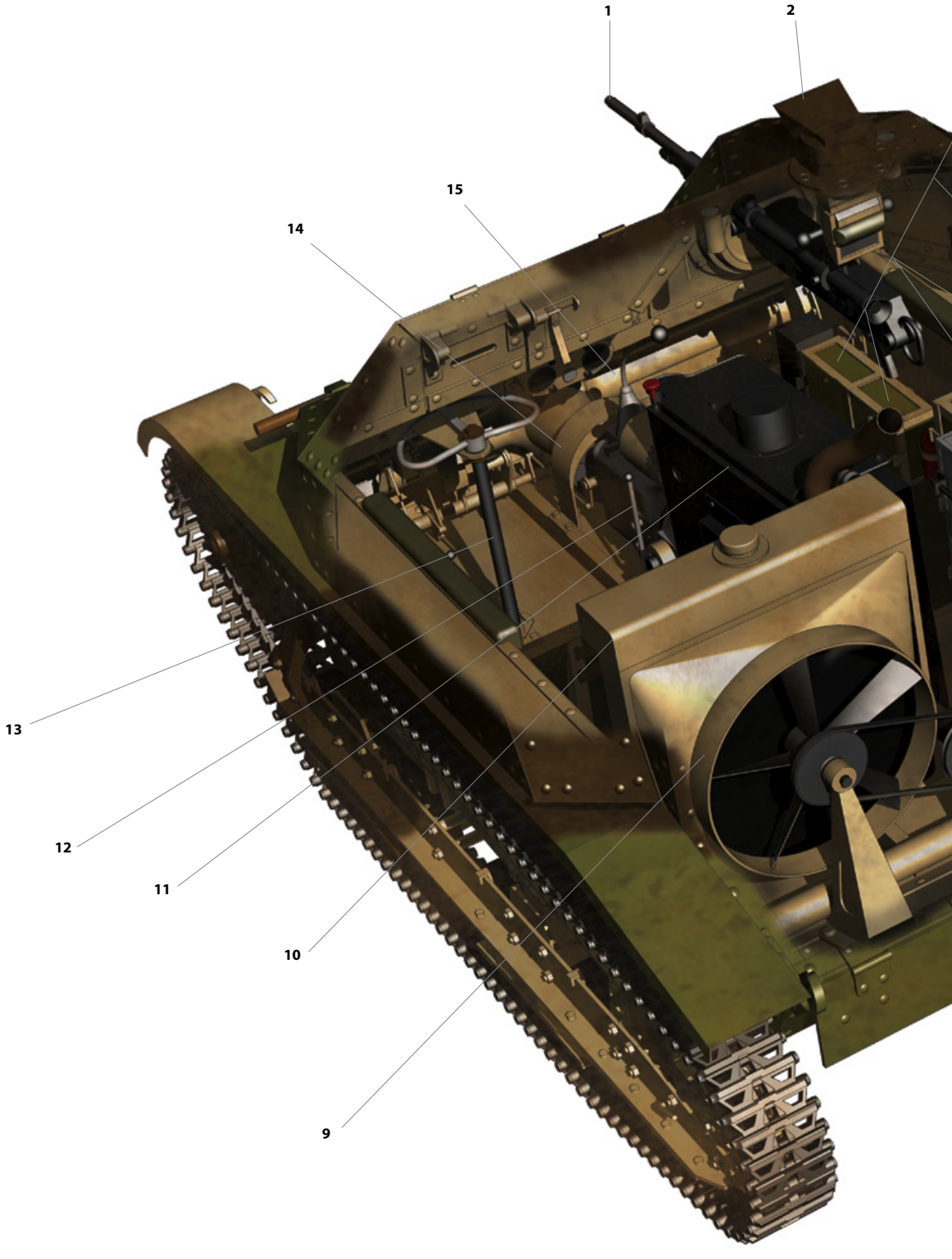

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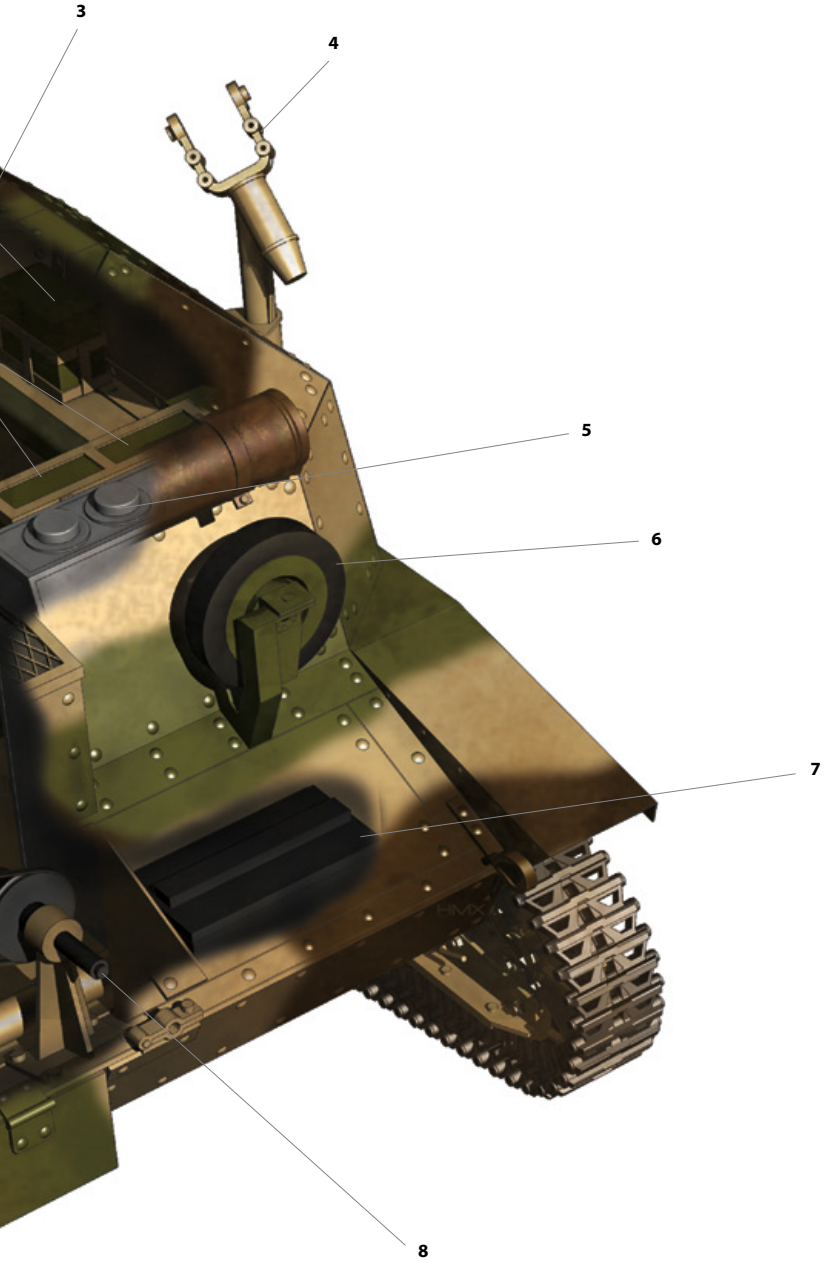

KEY

1. 7.92mm Hotchkiss wz. 25 machine gun
2. Gundlach periscope
3. Ammunition boxes
4. Antiaircraft mount
5. Fuel tank
6. Spare bogie wheel
7. Battery
8. Manual starter
9. Cooling fan
10. Radiator
11. Engine
12. Air outlet flap lever
13. Steering wheel
14. Differential
15. Gear shift lever

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The TKSD in the field with 10th Cavalry Brigade during 1938. The open crew compartment was fitted with bows for a tarp. Just beyond the TKSD's ammunition trailer is a TKD. (Both Jerzy Majka)

pressure, and could negotiate relatively steep inclines and water obstacles up to 20cm deep. Their size could also be a disadvantage as heavy vegetation could make target acquisition, visual communication, and formation keeping within units extremely difficult. This was compounded by the crew's very limited visibility when the hatches were closed. The need for a heavier weapon had always been anticipated, but the available 13.2mm Hotchkiss machine gun lacked the necessary penetration and accuracy.

To address this shortcoming, a support variant of the TK-3 – the TKD – was developed in 1932. Converted from the early-series mild steel TK-3s, the TKD carried a 47mm wz. 35 infantry gun in an open compartment. Four were produced, but the TKD was not adopted for series production, as the Army had not adopted the gun and its armor penetration was inadequate. They were attached to the 10th Cavalry Brigade and used during the annexation of ethnic Polish regions of Czechoslovakia in 1938. Their subsequent history is obscure. There is some suggestion they took part in the defense of Warsaw and a TKD chassis – minus the gun – appeared during the 1939 campaign.

The autotransporter was an attempt to enable tankettes to self-deploy over long distances while preserving the life of the tracks. Two autotransporters (top) with TKS tankettes, with Vickers E Type A and B tanks in the background. It was an ingenious but overly complex solution to the problem and trucks were used to transport tankettes instead. A modified Ursus A truck (bottom) loads a TK-3. (Michel Malec/ Adam Jońca)

Approximately 20 late-series TK-3s were fitted with the license-produced 42hp Polski FIAT-122AC engine in lieu of the imported 40hp Ford Model A engine and designated TKF. They were also retrofitted with TKS suspension components, but were otherwise externally similar to the TK-3. Financial considerations precluded the upgrade of the rest of the TK-3 inventory to TKF standards.

TKS

Based on experience with the TK-3/TKF, development of an improved tankette began in 1933. For reasons of economy, a completely new design was abandoned in favor of a modified TK-3. The first 20 vehicles were produced using mild steel and almost 300 were completed by 1939.

The most significant change was to the upper hull. The armor plates were sloped where possible to provide better ballistic protection and increased in thickness. The crew's situational awareness with observation flaps closed – problematic in the TK-3/

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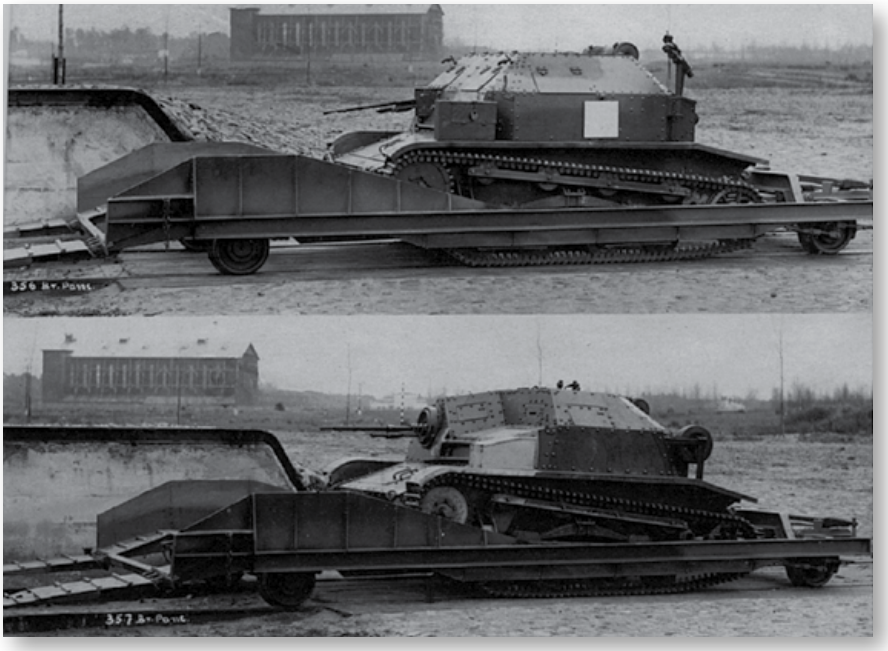

The armored draisine TK could carry either the TK-3 or TKS. Note they are in the lowered position, with the tracks resting on the rails to provide propulsion. Also visible to the left are the ramps that allowed them to unload for use away from the armored train. (Adam Jońca)

TKF – was greatly improved by providing the driver with a vision slot backed by a periscope and the commander/gunner with a Gundlach periscope in the top of the hull.

The suspension was strengthened and the tracks widened. The first 82 TKS used the same Polski FIAT-122AC engine found in the TKF. The engine used in subsequent production vehicles used larger diameter cylinders, a change that resulted in an increase to 45hp but also caused internal engine problems that were never completely resolved. Concurrent with the engine change, a new 4-speed transmission was installed.

A modern water-cooled 7.92mm wz. 30 Browning machine gun was initially fitted, but later replaced with the Hotchkiss when priority was given to issuing the Browning to the infantry. Unlike the simple open slot used in the TK-3, the machine gun in the TKS was fitted in a ball mount and equipped with a telescopic sight.

Draisines coupled in a TK-R-TK configuration and used with the armored train *Poznanczyk*. Note the TKs are in the raised position, with the tracks lifted off the rails. (www.derela.republika.pl)

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TOP
An armored draisine TK, part of a TK-R-TK set assigned to the 1st Armored Train Troop. Of particular interest is the radio equipment fitted to the tankette to allow communication with the armored train. These were the only tankettes so equipped. (Michel Malec)

ABOVE
The TK dismounted from its draisine, its bamboo antenna mast in the stowed position. Another distinguishing feature were the boxes on the vehicle fenders. (Adam Jońca)

In order to field a vehicle with a meaningful antitank capability, several foreign 20mm weapons were evaluated and both the Swiss Solothurn S18/100 and 37mm Puteaux were fitted for trials in the TKS. In early 1937, development started on a Polish-designed 20mm cannon. Testing proved that it had superior penetration to the Solothurn and the first 100 FK wz. 38 (also known as the FK-A) cannons were ordered in the spring of 1939. It was ultimately decided to rearm four vehicles in each tankette company and squadron with the cannon, beginning with the TKS, which required only minimal modification. Delays in the production of mounting kits resulted in only 24 TKS being rearmed by the beginning of the war.

A much more potent antitank vehicle, the TKSD, was developed in 1937 using the chassis of the C2P tractor. It carried the same modern 37mm Bofors wz. 36 cannon that served as Poland's primary towed antitank gun and the main armament of the 7TP tank. Although mounted in an open compartment, the mount had a much lower profile than the TKD. The TKSD is normally seen towing a small trailer that carried a portion of the 80-round ammunition supply. Only two prototypes were completed, but both saw action.

Tracks have a limited life and long-distance moves of tracked vehicles are normally conducted by train or on trailers to prevent breakdowns associated with excessive wear on the tracks or suspension components. To address this issue, Poland developed an autotransporter to enable tankettes to self-deploy over longer distances than would otherwise be possible. The autotransporter was a two-axle wheeled chassis constructed using Ursus A truck components. It had no engine and was instead powered by a chain connected to the tankette's drive sprocket. It was steered from the tankette driver's position, but was also fitted with a collapsible steering wheel and driver's seat to be used when being towed. Although a number were constructed, they do not appear as part of the tankette company's authorized equipment or in the unit

E

"COCKROACHES" AGAINST TANKS

One of the most celebrated actions of the Polish campaign is depicted here. Cadet Roman Edmund Orlik is a platoon leader in the reconnaissance tank company of the 71st Armored *Dywizjon/Wielkopolska* Cavalry Brigade. Ordered forward on September 18 near the Kampinos Forest, his 20mm-armed TKS takes up a masked position on a small hill overlooking a road marked with tank tracks. The other two tankettes with him are armed only with machine guns and Orlik has these withdraw a short distance to the rear. Soon after taking his position, German tanks of 11th Panzer Regiment, 1st Light Division emerge from the forest to his right. At close range, Orlik destroys three tanks; he is unsure of the tank types he has destroyed. Subsequent suggestions include PzKpfw 35(t)s and a PzKpfw IVD, commanded by Prince Victor Albrecht von Ratibor IV, who is killed on that date, but the evidence for specific vehicles is not compelling.

The next day, Orlik knocks out another seven German tanks – mostly PzKpfw 35(t)s from the same regiment – while participating in a larger action at Sieraków. He will survive the campaign, having destroyed 13 tanks. Orlik's record demonstrates the antitank value of the 20mm-armed TKS and suggests what might have been accomplished had it been more widely available.

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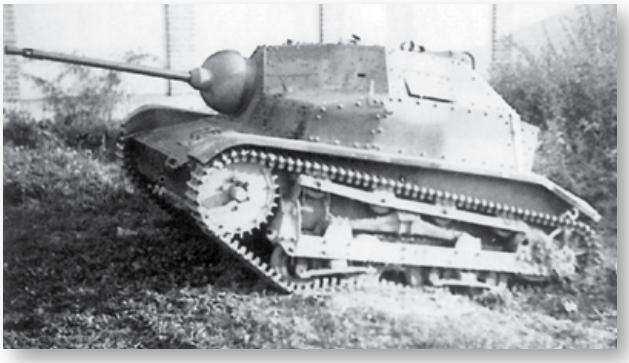


The TKS armed with a 20mm FK-A cannon was one of Poland's most capable antitank vehicles. At one point, arming all the TKS and TK-3 tankettes with this weapon was considered, but funding issues, production delays, and the onset of the war limited its introduction to a relative handful of TKS. It was mounted in a hemispherical mantlet and offset to the left. (www.derela.republika.pl)

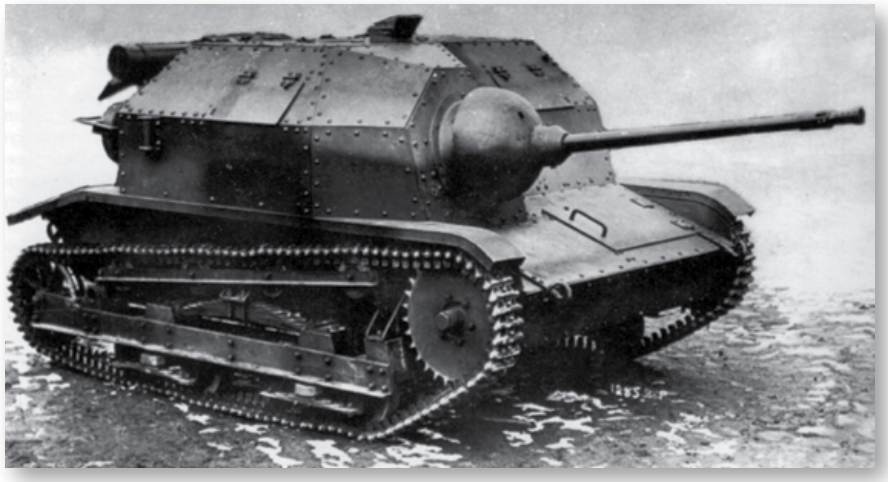
histories from the campaign. Due to their light weight and small size, tankettes could easily be carried by trucks and two slightly modified 4x2 trucks – typically a Ursus A with reinforced springs or FIAT 621L – were part of the Independent Reconnaissance Tank Company for this purpose.

In order to allow tankettes to be used in concert with armored trains, the "light rail-and-ground armored draisine TK" was accepted into service in 1936. This two-axle rail carriage used a framework with a moveable central girder. The hydraulically powered girder – which could be operated from within the tankette through an existing hatch in the hull bottom – allowed the TK-3 or TKS to be lowered so that the tankette's tracks rested on the rails, providing motive power for the draisine. When being propelled by another rail vehicle, the girder was raised, lifting the tankette's tracks off the rails. The draisine's design allowed the tankette to be quickly loaded and unloaded as necessary. This was an important feature given the tankette's limited field of fire and permitted reconnaissance some distance from the train. Tankettes employed with the draisines used easily fitted extensions to their horizontal suspension frames and two tankettes in each draisine platoon were equipped with a short-range RKBc radio.

The TK and R draisines were normally coupled in a TK-R-TK configuration with the R providing motive power for all three. Two such units were typically assigned to each armored train, one operating in advance of, and the other following, the train.

In Combat

Tankettes were organic to four types of wartime units: the reconnaissance tank squadron subordinate to the cavalry brigade's armored *dywizjon* and the motorized brigade's reconnaissance battalion; the reconnaissance tank companies at the army- and motorized brigade-level; and the armored draisine platoon attached to each armored train. The army-level companies were usually attached to the army's subordinate divisions or brigades. In at least one case, a company was parceled out with one platoon in support of two



Often misidentified as a TKS, the suspension and superstructure armor reveal that this is a TK-3, modified to carry the 20mm FK-A cannon and fitted with the Gundlach periscope normally seen on the TKS. There were plans to rearm at least some TK-3s, but apparently none apart from the prototype was converted. (Adam Jońca)

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A wz. 28 armored car. Although its Citroën-Kégresse suspension was of the latest design, the wz. 28's overall performance was a disappointment. It was replaced by a combination of wheeled armored cars and tankettes. Either a 37mm Puteaux cannon or a Hotchkiss machine gun armed the wz. 28. As shown in this photo, one vehicle in each platoon mounted the cannon; the other two had machine guns. (www.derela.republika.pl)

different regiments within a brigade.

Their combat histories reveal they typically performed a number of missions including reconnaissance, patrolling, route and flank security, delaying actions, participating in local counterattacks, and serving as a reserve force. Many were in worn condition at the start of the war and the tankettes suffered numerous non-combat losses. With thin armor, they usually suffered heavily when encountering enemy tanks or antitank guns. For example, the 32nd Independent Reconnaissance Tank Company was attached to the 1st Cavalry Regiment/Border Protection Corps of Army "Lodz." On September 5, it was supporting an attack by the regiment when it came under antitank gun fire that destroyed all six TKS tankettes of one of the platoons. Three days later, the company was ambushed by an antitank unit of the 24th Infantry Division and lost another five TKS. A subsequent withdrawal left the remaining two tankettes in such poor condition that they were not used again.

Nevertheless, they did manage to achieve some success. The 101st Reconnaissance Tank Company, attached to the 10th Cavalry Brigade, included four 20mm-armed TKS. The company, operating in cooperation with a TKSD, managed to destroy three tanks from the 4th Light Division and later took part in a successful counter-attack at Zboiska in southeastern Poland shortly before the brigade crossed into Hungary. Perhaps the most noteworthy action took place on September 17, when Cadet Ramon Orlik's lone 20mm armed TKS from the *Wielkopolska* Cavalry Brigade's armored *dywizjon* engaged armored elements of the 1st Light Division and destroyed three tanks (see Plate E). The next day, the *dywizjon*'s tankettes participated in the battle at Sieraków where Orlik destroyed another seven tanks.

The wz. 28 shared a feature common to all vehicles with tracks – high maintenance requirements. Here a crew works on their wz. 28. The cost, complexity, and maintenance demands overshadowed any gains in mobility. (Jacek Haber)

ARMORED CARS

By the early 1920s, Poland operated a number of armored car types that were indigenously produced, purchased from other countries, or captured during the Russo-Polish War. As part of an effort to modernize and standardize Poland's armored cars, a military commission was sent to France in 1923 to evaluate the Citroën-Kégresse half-track for possible purchase or license production. The Citroën-Kégresse was an innovative, modern platform that showed promise in early testing and was the basis for armored cars, artillery tractors, and other vehicles in the French army. The commission recommended buying only the chassis and Citroën-Kégresse B2 10CVs were ultimately purchased for armored car and other applications. Fitted with a

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The wz. 29's weight, lack of power, and absence of four-wheel drive effectively confined it to roads, where one sits abandoned and stripped of its weapons. Despite its many disadvantages, it gave useful service during the campaign. (Rajmund Szubański)

Polish-designed body, the new Polish armored car was type-classified as the wz. 28 in 1927 and 90 were in service by 1931. In 1939, three wz. 28 – formerly training vehicles – were formed into a provisional troop by Reserve Center No. 2, but were lost during the withdrawal to Hungary.

The shortcomings of the wz. 28 quickly become apparent. As with other half-tracks, it had the disadvantages of both wheeled and tracked vehicles. The tracks made it slower, more expensive, and required more maintenance than wheeled vehicles while the tires limited its cross-country mobility compared to fully tracked vehicles. Its performance was particularly poor in the sandy soils of eastern Poland, an important consideration given that Russia was seen as a likely opponent. Dissatisfaction with the wz. 28 prompted development of the wz. 29 and wz. 34, the primary armored cars in service during the 1939 campaign.

wz. 29

Developed for the cavalry, the wz. 29 was based on a strengthened Ursus A truck chassis, a modified version of the Italian S.P.A. 25C truck produced under license in Poland. The choice of a proven chassis eliminated some of

F

ARMORED CAR ACTION AT SZCZUKI

This scene depicts the action on September 4, when a troop of wz. 29 armored cars, part of the *Mazowiecka* Cavalry Brigade, engaged German armor after occupying a delaying position near the village of Szczuki (about 50 miles north of Warsaw). The troop was supporting the brigade's 7th Ulan Regiment when a platoon of tanks attempted to bypass the Polish position. The wz. 29s destroyed two PzKpfw Is, demonstrating the continuing effectiveness of the 37mm cannon against lightly armored vehicles. Later that afternoon, they observed a vehicle moving south from the town of Przasnysz, located just to the north of the Polish positions. They knocked out the vehicle, a German staff car, with cannon fire and cut down the occupants as they tried to flee. The car had been carrying a senior officer from the 1st Cavalry Brigade and a briefcase of documents. The documents were recovered and exploited, providing important insight into the plans of the German 3rd Army.

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wz. 29 Specifications	
Length	5.15m
Width	1.85m
Height	2.47m
Combat weight	4,800kg
Engine	35hp, 4-cylinder, gasoline
Speed	35km/h
Range	380km (road); 250km (cross-country) Fording depth: 35cm
Armor	Turret side: 10mm @ 75° Body side: 7mm @ 90° (lower), 9mm @ 75° (upper) Body rear: 9mm @ 90° (lower), 9mm @ 60° (middle), 6mm @ 22° (upper) Body front: 9mm @ 90°(lower), 9mm @ 60° (radiator cover), 9mm @ 50°(windscreen) Top/bottom: 4mm @ 0°
Armament	One 37mm Puteaux cannon with 96 rounds and two 7. 92mm wz. 25 Hotchkiss machine guns with 4,032 rounds
Crew	4 (driver, commander/gunner, rear driver, rear gunner)

the developmental problems normally associated with a new design and ensured a ready supply of spare parts. However, the engine was not well suited to carry the weight of the armor and only the rear wheels were driven, effectively limiting its use to roads. Interference from the electrical system precluded use of a radio, a major disadvantage for a reconnaissance vehicle.

The vehicle had a box-shaped body on which was mounted a manually traversed turret. Both were constructed of riveted face-hardened armor plates that offered protection against conventional small arms fire, shell fragments, and armor piercing small arms ammunition at ranges beyond 300m. Armor plate on the bottom of the body protected the interior and drive train. An armored flap protected the headlight and radiator, which was constructed in three independent segments to provide a measure of redundancy in case of damage. Access was by means of a two-part hatch in the turret roof and doors in the left and right sides of the body. There were numerous vision slots and flaps providing very good visibility.

The wz. 29 was armed with a 37mm Puteaux cannon and two 7.92mm Hotchkiss machine guns. The cannon and one machine gun were in the turret (the turret also had an antiaircraft mount, but its use was discontinued in the mid-1930s when increasing aircraft speed made it impractical). The weapons

A platoon of wz. 29 armored cars at the Armored Forces Training Center at Modlin. Underpowered, cramped internally despite its bulk, and having an obsolete configuration, only ten were acquired. Note the empty antiaircraft mount in the top of the turret. (Janusz Magnuski collection)

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wz. 34s on parade. The single vision flap in the driver's armor plate and the lack of sponsons clearly show this is a late-style body. (Jacek Haber)

were mounted asymmetrically, with the machine gun offset from the cannon by 120 degrees, in order to properly balance the turret. The other machine gun was mounted in the rear of the hull.

The wz. 29's slow speed, large size, lack of all-wheel drive, and poor maneuverability resulted in a small order and only ten examples were in service in 1934. One and possibly two wz. 29s in mild steel were used as the basis for unarmed loudspeaker vehicles, but it is unknown whether they were used by the military or police.

In Combat

Upon mobilization, a squadron of eight wz. 29s was assigned to the armored *dywizjon* of the *Mazowiecka* Cavalry Brigade, and employed as part of the force delaying the German advance from East Prussia. On September 1, they destroyed three armored cars of the 12th Infantry Division in an ambush at the cost of two damaged wz. 29s. The next day they skirmished with elements of the SS regiments *Der Führer* and *Deutschland* while attempting to maintain contact between friendly units and participating in local counterattacks with the 7th Uhlan Regiment, losing one wz. 29. Three days

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later near Szczuki, a wz. 29 destroyed two PzKpfw Is and a staff car and captured important operational documents (see Plate F). Delaying actions and withdrawals occurred over the next several days. The wz. 29s destroyed two armored cars of the 1st Cavalry Division on September 7 and another two armored cars on September 13 while losing a single wz. 29 to antitank gun fire. Several more wz. 29s were subsequently lost in a series of actions and their crews destroyed the remainder on September 16 after becoming immobilized in bad terrain.

wz. 34

wz. 34/wz. 34-II Specifications	
Length	3.62m/3.75m
Width	1.91m/1.95m
Height	2.20m/2.23m
Combat weight	approx. 2,100kg/2,200kg (MG) 2,200kg/2,400kg (Cannon)
Engine	20hp/25hp, 4-cylinder, gasoline
Speed	54km/h/50km/h
Range	250km/180km (road); 150km/90km (cross-country) Fording depth: 30cm
Armor	Turret side: 8mm Body front/side/rear: 8mm Top/bottom: 6mm
Armament	One 37mm Puteaux cannon with 96 rounds or one wz. 25 Hotchkiss machine guns with 2,000 rounds
Crew	2 (driver, commander/gunner)

The wz. 34 armored car resulted from an economical conversion of the wz. 28 in which the tracked rear suspension units were replaced with a wheeled axle. The first conversion underwent comparative testing with the wz. 28 in 1934. Another 11 wz. 28s were similarly converted that same year, although the wz. 34 was not formally accepted until 1935.

Production of the wz. 34 continued through 1938, with the conversion performed at the unit level. Mechanical changes introduced over the course of production resulted in three distinct models:

G

ARMORED CARS

1: This shows the wz. 29. This armored car was based on the Ursus A truck chassis. Its armor offered reasonable protection and it was armed with a 37mm Puteaux cannon and two machine guns. Its crew of four included a rear driver and rear gunner, who were undoubtedly underemployed, and a mount for an antiaircraft machine gun in the turret roof that wasn't useful against modern aircraft. More importantly, it was underpowered and, having rear-wheel drive only, was unsuitable for cross-county travel. It also lacked a radio. Because of its shortcomings, only ten were fielded.

2 & 3: These vehicles are variants of the wz. 34. Dissatisfaction with the earlier wz. 28 half-track armored car led to acquisition of distinct vehicle types with tankettes filling the need for a tracked reconnaissance vehicle and the wz. 34 providing the wheeled type. The key differences between the three formally designated versions were automotive in nature. The second profile shows the early body style, which had a vertical rear armor plate and shallow sponsons in the sides.

3: This shows the later style with sloping rear armor and no sponsons. As seen in these profiles, it was variously armed with either a single Hotchkiss machine gun or, for unit commanders, a 37mm Puteaux cannon. Like the wz. 29, they were not equipped with radios.

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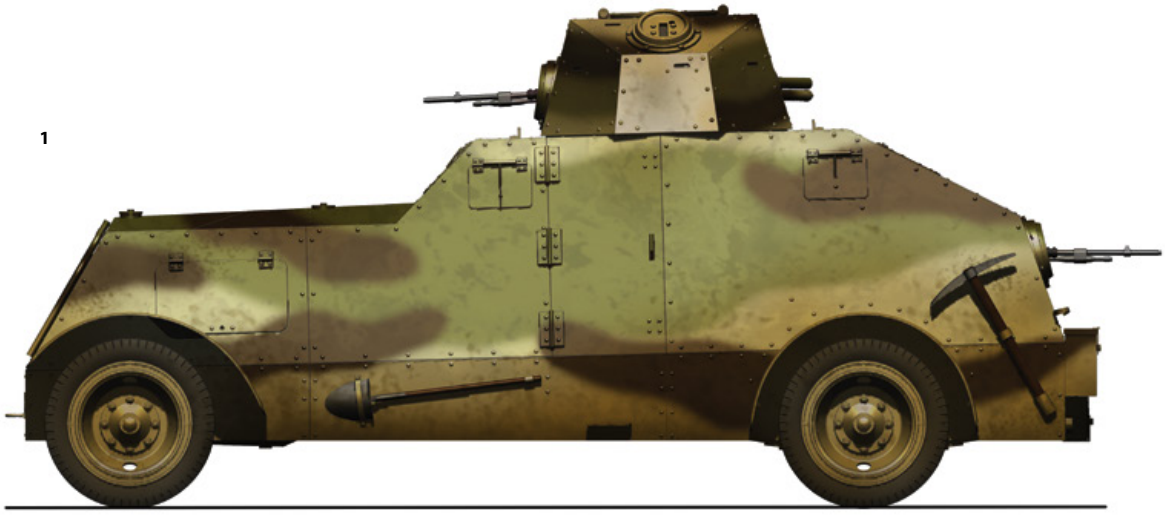
1



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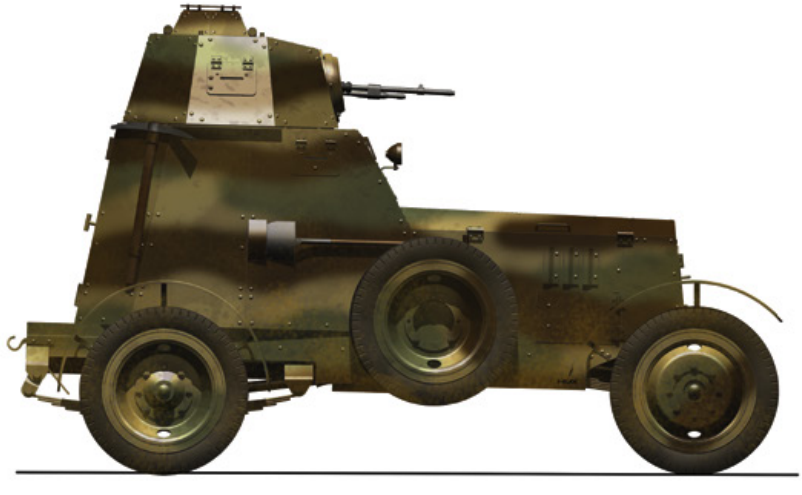

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A column of German troops passes a damaged wz. 34. This is the early style body with sponsons and vertical rear armor plate. When not in action, the commander-gunner sat on a seat visible on the left side of the interior. (www.derela.republika.pl)

wz. 34 – Tracked units replaced with a rear axle from the Polski FIAT 614 truck.
wz. 34-I – As with the wz. 34, but with a 23hp Polski FIAT 108 engine.
wz. 34-II – Used a more robust rear axle from the Polski FIAT 618 truck. It also featured a 25hp Polski FIAT 108-III engine, improved transmission, new electrical system, and hydraulic instead of mechanical brakes. The most numerous version.

The body was constructed of riveted face-hardened armor plates and fitted with a small manually operated octagonal turret. Doors in the left and the rear of the body provided access for the two-man crew. The floor of the body consisted of wooden planks laid on the chassis frame, which offered scant protection to the crew and allowed water to enter the fighting compartment during fording. A small two-part hexagonal cupola fitted to the top of the turret could be opened to improve vision for the commander/gunner. As with the wz. 29, no radio was fitted and communication was through signal flags.

Like the wz. 28, there were two different body styles, not differentiated by nomenclature. The early style had a vertical rear plate, side plates that widened into shallow sponsons, and two vision flaps in the driver's armored windscreen. The later style had a sloping rear plate, no sponsons, and a single vision flap in the windscreen.

A platoon commander's wz. 34. Commanders in armored car units had cannon-armed vehicles. The peacetime marking visible on the front – a circle with a vertical stripe – indicates the commander of the 1st platoon. (Janusz Magnuski collection)

The wz. 34's turret mounted either a 37mm Puteaux cannon or a 7.92mm Hotchkiss machine gun. Approximately one-third of the vehicles were armed with the 37mm Puteaux and were normally assigned to platoon, squadron, and *dywizjon* commanders.

In Combat

Eighty wz. 34s were mobilized in 1939. Like the wz. 29s, they were

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assigned to the cavalry brigades in squadrons of eight vehicles. They engaged in patrolling, delaying actions, local counterattacks, and withdrawals that on more than one occasion ended when the armored cars were unable to negotiate unfavorable terrain. The following are representative examples of the actions in which wz. 34s took part.

A platoon subordinate to the 21st Armored *Dywizjon*/*Wolyńska* Cavalry Brigade engaged tanks of the 4th Panzer Division near the village of Mokra I on September 1 resulting in the loss of one wz. 34. In mid-afternoon the armored cars took part in a counter-attack that caused such confusion that the Germans fired on their own units and forced a local German retreat, but at the cost of another three wz. 34s destroyed and one damaged.

The *Suwalska* Cavalry Brigade's armored car squadron was spared early combat, but was forced to make long marches over unimproved roads and was separated from their supporting maintenance element. Harried by the Germans, the squadron was attempting to cross the Mien River over a secondary route when they became immobilized on the swampy shoreline.

The armored cars of the *Podolska* Cavalry Brigade suffered a similar fate. After counterattacking and occupying blocking positions, they were forced to withdraw. Three wz. 34s were lost during the march due to mechanical issues and the remainder had to be abandoned after encountering soft ground in the Mien River valley.

In the first three days of the war, the armored cars of the *Krakowska* Cavalry Brigade fought defensive battles, delaying actions, and supported counterattacks by other elements of the brigade. On the night of September 2–3, five wz. 34s conducted a night ambush of armored vehicles from the 9th Reconnaissance Regiment/2nd Light Division. Using their spotlights to illuminate the Germans, the Poles destroyed three armored cars. While patrolling on September 8, the wz. 34s encountered motorized infantry elements and tanks from the 3rd Light Division, losing two armored cars. Later the same day, the wz. 34s surprised a motorized infantry column from the same division and inflicted heavy casualties.

During a road security mission on September 7, a wz. 34 platoon of the *Kresowa* Cavalry Brigade's *dywizjon* entered the village of Panaszew, near Lodz, surprising the headquarters staff of the 24th Infantry Division, but was driven off with the loss of two armored cars when the Germans brought up antitank guns. A third armored car was destroyed by friendly Polish fire.

On the night of August 31/September 1, a platoon of the 71st Armored *Dywizjon*/*Wielkopolska* Cavalry Brigade went into action against German saboteurs at Rawicz and was engaged in counterattacks on the 1st. On the 2nd, both wz. 34 platoons attempted to attack across the German border. The 2nd Platoon, operating in concert with infantry elements from the brigade, reached Königsdorf and destroyed a number of military vehicles.

The last organized Polish armored unit in the field was the wz. 34 squadron subordinate to the *Nowogródzka* Cavalry Brigade. Reorganized into an "armored-motorized group" that included captured German trucks and motorcycles, the squadron withdrew towards the Hungarian border along with remnants of four other cavalry brigades. A possibly unique event occurred on September 26, when the group fought two battles between Przemyśl and Lvov, one against German forces in the morning and one against the Soviets in the afternoon. Continuing its march, the group battled tanks of the Soviet 34th Cavalry Division and 26th Tank Brigade on the

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following day, losing one of its two remaining armored cars and a tankette. The last wz. 34 became bogged down shortly afterwards and was destroyed by its crew after it could not be recovered.

ARMORED VEHICLE-BASED PRIME MOVERS

C7P

C7P Specifications	
Length	4.6m
Width	2.41m
Height	2.4m
Combat weight	8,000–8,500kg
Engine	Saurer 115hp, 6-cylinder, diesel
Speed	26km/h
Range	150km
Crew	2 + 4 passengers

Concurrent with the development of the 7TP, work began on a tracked prime mover using many of the same components. The first prototypes appeared in 1933 and the vehicle was accepted for service the following year as the C7P. The vehicle primarily served in the 1st Heavy Artillery Regiment towing the unit's 220mm mortars and associated equipment. In addition, there were plans to use them for railway engineering tasks, but only two vehicles were allocated for evaluation in this role before the war.

In armor units they served as recovery vehicles in the units equipped with the R-35, 7TP, and Vickers tanks. Eighteen of the approximately 150 C7Ps built were used in this role. Another 32 C7Ps were ordered for armored units, but it is unknown if any of these vehicles were delivered.

It used the same lower hull, suspension, transmission, and engine as the 7TP and had a light superstructure that protected the crew and passengers from the elements. For recovery missions, it was equipped with a towing pintle and a winch with a 5,000kg pull.

207]: A tractor from the 42nd light tank company restored
o working order by the Germans, served them for pulling
nto the road some Vickers tanks of that company, aban-
loned within the forest due to lack of fuel.

German troops recover Vickers tanks of the 12th Light Tank Company after they were abandoned due to lack of fuel using the company's C7P. (Adam Jońca)

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The C2P. (Michel Malec)

C2P

C2P Specifications	
Length	3m
Width	1.58m
Height	1.8m
Combat weight	2,750kg
Engine	FIAT 122 46hp, 6-cylinder, gasoline
Speed	45km/h
Crew	1 + 3 passengers

The C2P was developed to tow the 75mm wz. 29 field gun. The 1933 prototype was essentially a TKS tankette with the upper hull removed. Testing revealed a number of deficiencies, including that towing overloaded the rear of the vehicle. The most visible of the corrective changes made involved increasing the diameter of the idler wheel and lowering it to make contact with ground. It entered service, not as originally intended, but as the prime mover for the 40mm wz. 36 Bofors antiaircraft gun and its two-axle ammunition trailer.

ANALYSIS AND CONCLUSIONS

The Polish Second Republic was in an unenviable strategic position. It faced a resurgent and increasingly aggressive Germany to the west and north and a hostile Soviet Union to the east. It faced severe economic problems, had a relatively limited heavy industrial base, and almost a third of the population consisted of ethnic minorities.

As noted in the Introduction, Poland had fallen far behind Germany and the Soviet Union in terms of its number of armored vehicles. Technologically, the Poles were better able to keep pace. They quickly realized the limitations of their FT-17s and mixed inventory of armored cars. The lack of armored vehicle design experience and the state of its heavy industry led Poland to look to foreign sources for armored vehicles, particularly France and Great

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Britain. Despite occasional setbacks – for example, a dispute concerning a production license derailed plans to purchase US designer J. Walter Christie's tank – they were able to acquire what were, at the time, state-of-the-art vehicles. Moreover, the Poles were adept at introducing modifications that improved the vehicles they purchased. Their most capable vehicle – the 7TP – was comparable or superior to almost all the armored vehicle types fielded by Germany and the Soviet Union in the campaign.

Unfortunately for Poland, they had relatively few 7TPs. The vast majority of their armored vehicles were tankettes armed only with a machine gun, the armored cars were outdated, and many of the armored vehicles were mechanically worn. Somewhat paradoxically, Poland's initial success at acquiring vehicles left it with a force that was cost-prohibitive and impractical to continually upgrade. In addition, as war seemed more likely and French and British were themselves rearming, the Poles were unable to purchase the modern tanks and other equipment it wanted and most needed.

Throughout the last half of the 1930s, the Armored Forces Technical Research Bureau (BBT Br.Panc.) and PZInż. were active in the design and prototyping of a number of new types, such as the 4TP reconnaissance tank and the 10TP and 14TP main battle tanks. In particular, the 14TP would likely have given the Poles a medium tank that was at least as good as, if not better, than the PzKpfw III of the period. It was simply too late.

More importantly, they had fallen behind in terms of development of armor doctrine. The limited insights provided by the Russo-Polish War into the potential for mobile armored warfare did not gain traction. Not only had France been instrumental in the establishment of Poland's tank arm and continued to be an important source of weapons, it provided advisors and instructors that played a key role in the professionalization of the Polish military. As a consequence, Polish views on employment of armor reflected those of the French, which envisioned armor as a supporting weapon. Cavalry was seen as the decisive mobile arm. Poland was, however, acutely aware of the rapid mechanization of the German and Soviet armed forces and a special study group was convened in 1936 to examine this and its implications for Poland. The group correctly identified the potential threat to the Polish Army and, in fact, by the mid-1930s, plans were in place for stronger and better-balanced mechanized units. The two motorized brigades – the 10th Cavalry Brigade and the Warsaw Armored-Motorized Brigade – were the first steps in implementing those plans.

The French-inspired doctrinal view was reflected in the roles and distribution of armored vehicles. For the most part, they were parceled out in small units across the Army, diluting their strength, and used mainly for reconnaissance and as a reserve force. During the war, the demand for their services was enormous and they were frequently committed in groups as small as platoons. Despite their small numbers, they fought aggressively and sometimes achieved striking local successes. That they were unable to alter the inevitable outcome of the campaign does not diminish their contributions.

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APPENDICES

Appendix 1: Light Tank Battalion (7TP)

Battalion Headquarters

1 x 7TP (single-turret) w/ N-2/C radio
3 x Polski-FIAT 508 III or 518 field cars
3 x Sokol 1000 M111 motorcycles w/sidecar
1 x Polski-FIAT 621L ambulance
1 x Polski-FIAT 621L cargo truck

Air Defense Platoon
4x Polski-FIAT 508/518 light truck armed w/ machine gun

Special (Traffic Control, Engineer and Chemical Defense) Platoon
7 x Sokol 1000 M111 motorcycles w/sidecar
3 x Poliski-FIAT 621L or Ursus A trucks

Signal Platoon
3 x Polski-FIAT 508/518 radio cars w/ 1x N-1/S and 2 x N-2/S radios (reduced to 1x in early 1939)
1 x Polski-FIAT 508/518 telephone car w/ telephone trailer
3 x Sokol 1000 M111 motorcycles w/sidecar (PLT Cdr and 2 x air liaison

Tank Company

1 x 7TP w/ N-2/C radio
1 x Polski-FIAT 508 III Lazik field car
1 x Sokol 1000 M111 motorcycle w/sidecar
3 x Tank Platoons each with

1 x 7TP (single-turret) w/ N-2/C radio

Tank Section
2 x 7TP

Repair Patrol
1 x wz.34 Citroen-Kegresse half-track workshop van truck
1 x fuel trailer

Supply Team
2 x Polski-FIAT 621L cargo trucks
1 x field kitchen trailer

Maintenance and Supply Company

1 x Polski-FIAT 508 III Lazik field car

Maintenance Platoon
2 x Polski-FIAT 621L workshop van truck
1 x Polski-FIAT 621L generator truck
1 x generator trailer

Supply Platoon
3 x C7P recovery tractors
3 x tank transport trailers
25 x Polski-FIAT 621L trucks
4 x Polski-FIAT 621L fuel trucks
3 x fuel trailer
1 x field kitchen trailer

Appendix 2: Light Tank Battalion (R-35) (Notional As Fielded)

Battalion Headquarters

2 x Laffly S15R
3 x Sokol 1000 M111 motorcycle w/sidecar
1 x Polski-FIAT 621L ambulance
1 x Polski-FIAT 621L cargo truck
1 x Polski-FIAT 518 car

Air Defense Platoon
4x Polski-FIAT 621L truck armed w/machine gun
1x Sokol 1000 M111 motorcycle w/sidecar

Special Platoon
1 x Sokol 1000 M111 motorcycle w/sidecar

Traffic Control Team
6 x Sokol 1000 M111 motorcycles w/sidecar

Engineer/Chemical Defense Team
3 x Poliski-FIAT 621L or Ursus A trucks

Signal Team
1 x Polski-FIAT 618 car w/ 1 x N-1/s radio
4 x cargo trucks with telephone equipment

Tank Company

1 x R-35
1 x Laffly S15R
1 x Sokol 1000 M111 motorcycle w/sidecar

4x Tank Platoons each with
3 x R-35
1 x Sokol 1000 M111 motorcycle w/sidecar

Maintenance and Supply Platoon
7 x cargo trucks
4 x fuel trailer
1 x kitchen trailer

Maintenance and Supply Company

1 x Polski-FIAT 508 III Lazik field car

Reserve Tank Platoon
6 x R-35
1 x Sokol 1000 M111 motorcycle w/sidecar
3 x cargo trucks

Maintenance Platoon
1 x C7P recovery tractor
1 x trailer-mounted crane
2 x Latil or Renault workshop van trucks
1 x Polski-FIAT 621L cargo truck
1 x Sokol 1000 M111 motorcycle w/sidecar

Supply Platoon
3 x C7P recovery tractors
3 x tank transport trailers
23 x Polski-FIAT 621L or Ursus cargo trucks
4 x Polski-FIAT 621L or Ursus fuel trucks
12 x fuel trailers
1 x field kitchen trailer

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Appendix 3: Armored *Dywizjon*

Dywizjon *Headquarters*

1 x wz. 29 or wz. 34 armored car
2 x 508 III Lazik field car
3 x Sokol 1000 M111 motorcycles w/sidecar
1 x Polski-FIAT 621L ambulance
1 x Polski-FIAT 621L cargo truck

Traffic Control Team
4 x Sokol 1000 M111 motorcycles w/sidecar

Communication Team
1 x Polski-Fiat 508/518 car w/ N-1/S radio
1 x Sokol 1000 M111 motorcycle w/sidecar (air liaison)

Engineer/Chemical Defense Team
3 x Polski-Fiat F 508/518 light van trucks

Maintenance and Supply Platoon
9 x Polski-FIAT 621L cargo trucks
3 x Polski-FIAT 621L fuel trucks w/fuel trailers
2 x Polski-FIAT 621L tankette transporters
1 x Polski-FIAT 621L workshop van truck w/ generator trailer
1 x Sokol 1000 M111 motorcycle w/sidecar
1 x field kitchen trailer

Armored Car Squadron

1 x wz. 29 or wz. 34 (w/37 mm) armored car
1 x 508 III Lazik field car
1 x Polski-Fiat 508/518 light truck w/ N-2/S radio
3 x Sokol 1000 M111 motorcycles w/sidecar (messengers and air liaison)

Armored Car Platoon
1 x wz. 29 or wz. 34 (w/37 mm) armored car
1 x Sokol 1000 M111 motorcycle w/sidecar

Armored Car Section
2 x wz. 29 or wz. 34 (w/MG) armored cars
1 x Polski-Fiat 508 III light workshop van truck

Supply Team
2 x Polski-FIAT 621L cargo trucks
1 x fuel trailer
1 x field kitchen trailer

Tankette Squadron

1 x TK-3 or TKS tankette (w/20 mm)
1 x 508 III Lazik field car
1 x Polski-Fiat 508/518 light truck w/ N-2/S radio
3 x Sokol 1000 M111 motorcycles w/sidecar (messengers and air liaison)

Tankette Platoon
1 x TK-3 or TKS tankette
1 x Sokol 1000 M111 motorcycle w/sidecar

Tankette Section
2 x TK-3 or TKS (one TKS w/20 mm)

Repair Patrol
1 x TK-3 or TKS
1 x tracked trailer

Supply Team
2 x Polski-FIAT 621L cargo trucks
1 x fuel trailer
1 x field kitchen trailer

Appendix 4: Independent Reconnaissance Tank Company

Company Headquarters

1 x TK-3 or TKS tankette
1 x Polski-FIAT 508 III Lazik field car
3 x Sokol 1000 M111 motorcycles w/sidecar
1 x Polski-FIAT 508 III ambulance

Communication Team
2 x Polski-Fiat 508/518 light trucks w/N-1/S radio
1 x Sokol 1000 M111 motorcycle w/sidecar (air liaison)

Engineer/Chemical Defense Section
2 x Polski-Fiat F 508/518 light van trucks

Tankette Platoon

1 x TK-3 or TKS tankette
1 x Sokol 1000 M111 motorcycle w/sidecar

Tankette Section
2x TK-3 or TKS (one TKS w/20 mm)

Repair Patrol
1 x TK-3 or TKS
1 x tracked trailer

Maintenance and Supply Platoon

5 x Polski-FIAT 621L cargo trucks
1 x Polski-FIAT 621L fuel truck
2 x fuel trailers
2 x Ursus A or Polski-FIAT 621L tankette transporters
1 x Polski-FIAT 621L workshop van truck
1 x Sokol 1000 M111 motorcycle w/sidecar
1 x field kitchen trailer

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Chart 5 - Reconnaissance Tank Squadron/Reconnaissance *Dywizjon* / Cavalry Brigade (Motorized)

Tankette Squadron

1 x TK-3 or TKS tankette
1 x 508 III Lazik field car
1 x Polski-Fiat 508/518 light truck w/radio
1 x Sokol 1000 M111 motorcycles w/sidecar
1 x Sokol 600 M211 solo motorcycle

Tankette Platoon
1 x TK-3 or TKS tankette
1 x Sokol 1000 M111 motorcycle w/sidecar

Tankette Section
2 x TK-3 or TKS (one TKS w/20 mm)

Repair Patrol
1 x TK-3 or TKS
1 x tracked trailer

Maintenance and Supply Team
2 x Polski-FIAT 621L cargo trucks
1 x Polski-FIAT 621L fuel truck
1 x fuel trailer
1 x 508 III light truck
1x Sokol 1000 M111 motorcycle w/sidecar

Appendix 6: Light Tank Company (Vickers E)

Company Headquarters

1 x Vickers E (single-turret)
1 x Polski-FIAT 508 III Lazik field car
1 x Polski-Fiat 508 III light truck w/RKD radio
1 x Polski-Fiat 508 III telephone truck
1 x Polski-FIAT 508 III ambulance
3 x Sokol 1000 M111 motorcycles w/sidecar
2 x Sokol 600 solo motorcycles

Tank Platoon

1 x Vickers E (single-turret)
1 x Sokol 1000 M111 motorcycle w/sidecar

Tank Section
2x Vickers E (one single-turret)

Repair Patrol
1x half-track workshop van truck
1x fuel trailer

Maintenance and Supply Platoon

5 x Polski-FIAT 621L trucks
1 x Polski-FIAT 621L fuel truck
1 x fuel trailer
1 x field kitchen trailer
1 x Sokol 1000 M111 motorcycle w/sidecar

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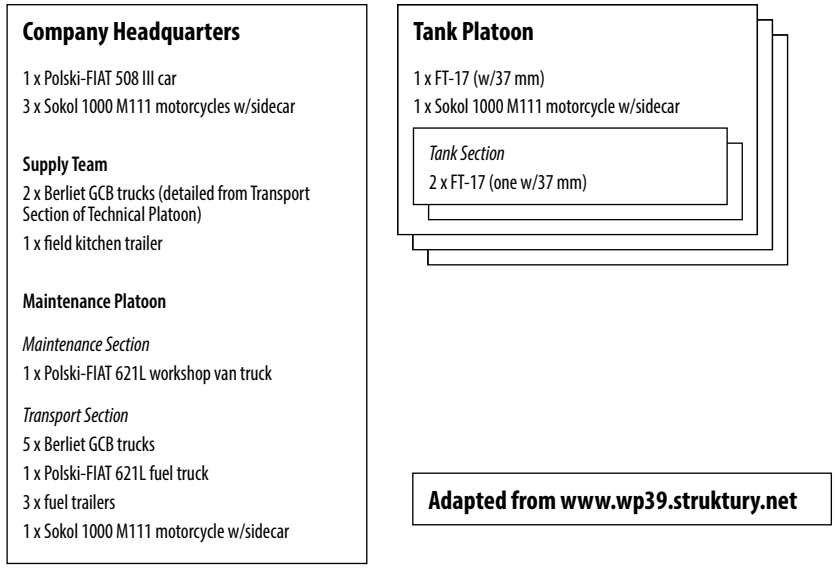
Appendix 7: Light Tank Company (FT-17)


Company Headquarters
1 x Polski-FIAT 508 III car
3 x Sokol 1000 M111 motorcycles w/sidecar
Supply Team
2 x Berliet GCB trucks (detailed from Transport Section of Technical Platoon)
1 x field kitchen trailer
Maintenance Platoon
Maintenance Section
1 x Polski-FIAT 621L workshop van truck
Transport Section
5 x Berliet GCB trucks
1 x Polski-FIAT 621L fuel truck
3 x fuel trailers
1 x Sokol 1000 M111 motorcycle w/sidecar
Tank Platoon
1 x FT-17 (w/37 mm)
1 x Sokol 1000 M111 motorcycle w/sidecar
Tank Section
2 x FT-17 (one w/37 mm)
Adapted from www.wp39.struktury.net

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